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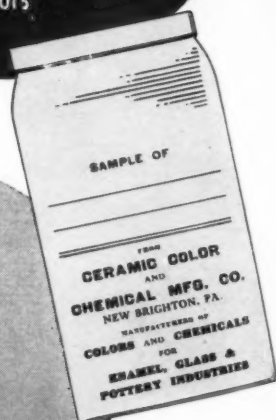
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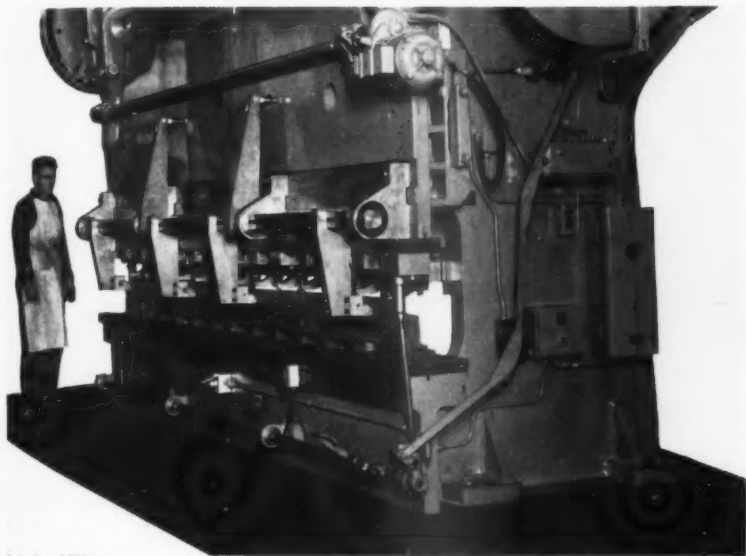


CERAMIC COLOR & CHEMICAL MFG. CO.
New Brighton, Pa., U.S.A.



SUGGESTION BOX

Multiple punching setup ups production 500%



Press brake equipped with special multiple punching setup for punching support angles. Special pneumatic clamping equipment is shown in front of the machine.

THE operation time for punching support angles for dust collectors was reduced from 6.0 minute per piece to 1.2 minute per piece by the application of a press brake at the Mishawaka (Indiana) plant of The American Wheelabrator & Equipment Company.

This machine is equipped with a special multiple punching setup that eliminates the necessity of layout and replaces a single punch operation, resulting in huge saving in the punching time on support angles, support channels, side angles and truss braces for the dust collectors. The holes had to be laid out previously by hand with a template, then punched one at a time. Now, the press brake is set up, the L-angles and channels are placed in the machine, and all holes in a side are punched at one time. Layout is completely eliminated on these pieces.

The punching equipment includes

two sets of interchangeable punching blocks and covers the entire range of channels and angles. This includes structural channels from 3"-4.1 lbs. to 8"-11.5 lbs., and structural angles to 5" x 5" x 3/8". The maximum hole diameter is 1-3/16". The equipment is arranged to punch either leg of the angles and both the web and flange of channels. The punches are provided with fixed strippers.

The equipment shown on the front of the machine is special pneumatic clamping equipment. Two air cylinders are attached to the ram of the press brake, and with the machine at the top of the stroke the clamp is in the "out" position. As the ram moves down, the air pistons rotate the clamp which automatically holds the angles and channels securely to the punching blocks.

The punching bolsters are kept in alignment by means of two leader pin sets, so that the equipment can be

quickly placed into the press brake or removed to make the brake available for regular bending and forming work.

Source for further information on this advantageous tool-up development may be obtained without obligation by writing finish.

TENTATIVE PROGRAM FOR PEI ANNUAL SHOP PRACTICES FORUM

Dr. G. H. McIntyre, chairman of the Forum Committee, has announced the tentative program for the 12th annual Shop Practices Forum to be held at the University of Illinois, September 13, 14 and 15 under the sponsorship of the Porcelain Enamel Institute.

New Application Methods. An afternoon will be given over to the consideration of latest application techniques for pertinent subjects, including the following: "Dry Drawing," "Magnetic Separation," "Hot Spraying" and "Ball Mill Grinding."

Symposium on "One Coat Porcelain Enamel Directly on Steel." This subject will be presented by leading authorities in the industry and discussing its various phases.

Symposium on "Stresses and Strain in the Enamel Iron System." Presentation of this topic will be of interest to every enameler. Industry experts will treat this subject so that the material will be of practical value.

New Product Development. A complete half-day session will be devoted to discussion on important latest developments on various topics, including "Porcelain Enamel on Aluminum," "Architectural Porcelain Enamel" and "High Temperature Coatings."

Quality Control. This session will cover "Elementary Essentials of Quality Control" and "Statistical Quality Control and its Application."

Board of Experts. A panel of experts will attempt to answer any and all questions asked on present industrial problems in the finishing industry.



Try McDanel Mill Lining Brick on your next relining job. Extra firing in their manufacture assures the complete vitrification that makes them tougher and longer wearing. Their longer service boosts production per installation—cuts expenses and downtime.

McDanel Mill Lining Brick come in a complete range of sizes to suit all mills and with McDanel Fill-In Brick they make the mason's work easier, speed up the relining job and get the mill into production quicker.

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Made from specially developed vitreous porcelain body and hand rolled for faster, uniform grinding. Mill tested and individually inspected before shipment to you.

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150 N. Norton Ave., Los Angeles, Calif.

The induction heater as a tool in fabrication

a process warranting thorough investigation by manufacturers of appliances, appliance components, and allied metal products *and cut*

by Gilbert C. Close

*Exclusive
feature*
finish

Developments in the past ten years in high speed brazing, using the induction heater as a source of brazing heat, have proved to be a great boon in the home appliance industry. In many firms, thousands of duplicate parts, formerly cast, forged or machined, are now fabricated by brazing. In general, these parts are cheaper to produce and will be equal to or better in quality than similar parts produced by one of the former methods. The one hitch in the situation seems to be that many firms have failed to recognize the value of the process and are not using it, despite the fact that it could cut corners on many production line costs.

Refrigerator part production increased 420 units per hour

One well-known home refrigerator parts manufacturer found that manual silver brazing of noxious gas line strainers, using an oxy-acetylene torch and hand-fed brazing alloy, was not only costly, but too slow to be practical. An induction heater was installed and tooled for brazing. Subsequent production jumped from 60 to 480 units per hour, and material cost savings were in excess of 25 per cent. In addition, operating costs were reduced to 25 per cent of the old method, rejections were fewer, the work was simplified, and material

and production planning costs dropped accordingly.

Brazing has always been considered a desirable method of joining metals, but was hampered by the slowness of hand production or the necessity of installing costly brazing furnaces. In many cases, brazed parts can be used in place of castings or forgings, or to eliminate a great deal of machine work in the production of complicated

machined shapes. Part components brazed together will often serve just as efficiently as an integral or "solid" part produced by one of the more costly methods.

The induction heater not only eliminates the low hand-production figure and costly furnaces, but reduces labor skill requirements, occupies but a small amount of space, and can be fitted neatly into the



Typical mass production installation showing four 2-position induction heaters set up for multiple brazing work.

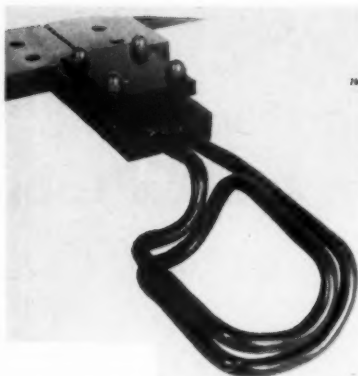
normal flow pattern of any production line. Parts brazed by induction are more uniform and there will be fewer rejections than when using either of the older methods.

Specific advantages

The specific advantages of using the induction heater for brazing are many. Great production speed is possible, as it takes only a matter of seconds to heat and flow the braze metal through the joint. When the output of the induction heater is large enough, additional speed may be realized by brazing several parts in a single operation.

Very little skill is required to operate an induction heater once the heating coil has been designed and proper machine settings established. It can be tooled to operate on an automatic cut-off cycle, thus assuring uniformity and equal heating of each part. A mere novice can turn out perfectly brazed parts after a few moments of elementary instruction. Both production speed and reduced labor skill requirements contribute to lower overall costs.

Another advantage of brazing by induction is the complete absence of parts warpage that often occurs in furnace or flame brazing, and the elimination of surface oxidation during the heating cycle. As the heat is usually applied only to the area being



A typical induction heating coil.

brazed, other portions of the part remain cool and warpage is eliminated. The rapidity of the heating cycle (usually a matter of seconds) reduces surface oxidation and scaling to a negligible amount. This, too, results in a saving in time and costs over the older methods where parts often required subsequent straightening and descaling operations.

Cost comparisons of fuel consumption between induction brazing and either of the older methods are decidedly in favor of the former. Actual studies show an average 10 to 1 ratio in favor of current costs over gas or oven fuel costs, and with some parts this ratio runs as high as 25 to 1.

Fundamentals of induction heating

A thorough understanding of the

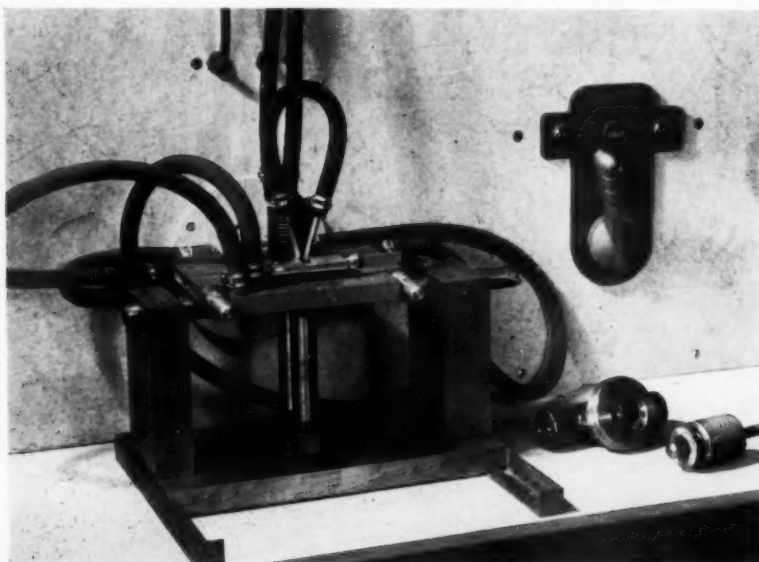
fundamentals of induction heating is the best guide to its possible applications in a field where thousands of applications exist. The induction heating unit itself is merely a device for creating a high frequency alternating current and feeding it through a heating coil. There are three commonly accepted methods for obtaining the desired frequency ranges. Motor-generator sets operate in the lower range of frequencies (600-12,000 cycles), and are widely used for deep-heating of metals in many hardening operations. The electronic tube converters deliver high frequencies (100-15,000 kilocycles), and are generally employed with non-metallic materials, such as in the bonding of plywood. The type of set most adaptable to light and medium brazing operations is of the quenched spark-gap type. These units deliver frequencies from 15,000 to 300,000 cycles a second, are simple to operate, practically trouble-free, and heat applications are easy to control.

As the high frequency current feeds through the heating coil, an intense alternating magnetic field is set up within the coil and in the immediate external vicinity. Metallic parts placed in this magnetic field will have induced in them eddy currents which generate heat in the metal on the same principle that heat is generated in a current-carrying wire. If the metallic parts are magnetic, an addition factor called "hysteresis", or resistance to magnetic polarity change, will also contribute to the heating.

The eddy currents are generated first in the surface of the part. As the surface temperature of the part rises, the eddy currents work progressively deeper. Thus the depth to which the metal is heated is controlled by the length of the heating cycle.

Heating is also controlled by the nearness of the part to the heating coil. The closer the coupling, the more rapidly heating progresses. The above two factors make possible very close control over application of heat to any part. A correctly designed heating coil in which the part is properly positioned will heat only

Coil and fixture for brazing a bellows-type valve for a refrigerator unit.



those areas of the part to be brazed along with the braze metal. The remainder of the part will remain comparatively cool—often cool to the touch. This unique characteristic of the process not only eliminates the aforementioned warpage and surface oxidation, but is responsible for the huge reduction in fuel costs. Heat is not wasted in remote portions of the part where it serves detrimental rather than advantageous purposes.

Equipment and operating considerations

The number of parts that can be brazed at one time depends upon the size of the part, the brazing area, and the output of the induction heater. In considering the purchase of any induction heater, some thought should be given to possible future requirements, and also to auxiliary uses to which the heater might be put in conjunction with brazing. Photographs with this article show vividly how multiple heating coils are designed and the great advantages of their use.

As with older methods of brazing, certain practices must be observed when brazing with the induction heater. The parts must be thoroughly clean prior to brazing. The heating coil design must assure even heating of all surfaces to be brazed. During brazing, the part must be positioned so that gravity will expedite flow of the brazing metal. This factor should be remembered during coil design.

In some operations, the heating coil will heat one part component while the other component will be heated by conduction from the first. With other types of parts it will be possible to heat all components as well as the braze metal directly by induction. Here again heating coil design will determine the actual method of accomplishment.

Heating coils are usually constructed of hollow copper tubing varying between 1/8-inch and 1/4-inch outside diameter. The coils are water-cooled during use. The shape to which the tubing must be formed during coil construction will depend upon the part involved and individual experience. A coil may be wound and re-wound and sample parts brazed until

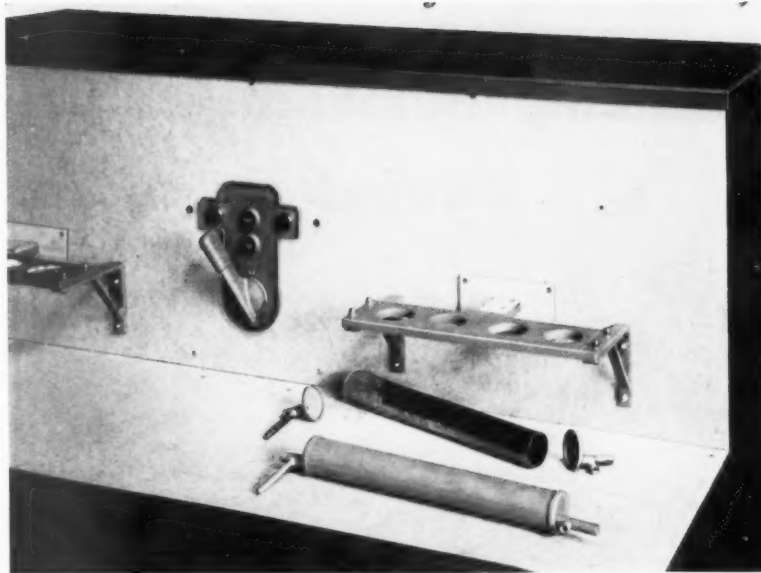


Photo shows heating coil (enclosed) and components used to fabricate gasoline stove generator assemblies by brazing.

optimum design is determined. The same tubing may be employed for winding experimental coils, but once a design is established, it should be retained for future use.

The objection is sometimes raised that there is not enough brazing work in a plant to keep an induction

heater busy. Such an objection is usually due to lack of knowledge concerning the versatility of this type of equipment. The induction heater used for brazing can be employed just as effectively for such diverse jobs as surface hardening, annealing,

to Page 64 →

Set-up for brazing copper clad plate to bottom of pressure cooker. Kettle in position shown on right jig. The jig is raised to bring the bottom of the kettle near the heating coil in the upper circular element.



Avoiding enamel difficulties through proper furnace operation

by *M. Boysin* • FERRO ENAMEL CORPORATION, CLEVELAND, OHIO

Part II

WHEN any fuel is burned, a certain amount of air is required. If it is burned with less than that amount, carbon monoxide forms. Therefore, all available heat is not utilized. If it is burned with too much air, complete combustion results, but excess air is heated and passed up the stack.

Proper combustion is important

The combustion chamber was designed to burn fuel mixed with a proper amount of air. If more air is present, it cannot be handled by the combustion chamber. Therefore, heat input is cut and the stack cannot take care of the excess amount of air, causing pressure. This forces combustion products into the muffle and thus contaminates furnace atmosphere as well as plant atmosphere.

Note these figures. With 2% carbon dioxide passing up a stack, 74% of the available heat is lost. Now if 10,000 cubic feet an hour is consumed in a large furnace, wasting of fuel is evident. If the analysis is 14% carbon dioxide instead of 2%, 1% of the heat is wasted.

The simplest way to determine heat loss is by means of a conventional Orsat apparatus. Multiply the percentage of heat loss by the amount and cost of fuel used, and the waste in actual dollars can be determined.

Another means of controlling combustion, of course, is that of draft. Therefore, it is good practice to have a draft gauge available. Suppose the damper broke, resulting in more draft than is needed, thus wasting heat. On the other hand, obstruction in the stack will cut draft down and combustion products will bleed into the furnace and plant, resulting in con-

tamination. For example, a plant maintenance man closed the damper on a continuous furnace during a gas shortage because he thought this would save gas. Immediately the plant was in the worst siege of scumming they had ever experienced. All the products of combustion from the burners were passing up through the muffle into the plant. They had practically 100% rejects because of this closed damper. If there had been a draft gauge on that stack and the control man or the foreman had watched it, this would not have happened.

Therefore, to save money and improve the quality of ware, set up a control process for checking combustion efficiency and draft. In a small plant, \$100.00 will be sufficient for an Orsat and draft gauge.

If several continuous furnaces and a great deal of combustion equipment is used, it pays to invest anywhere from \$300.00 to \$600.00 in equipment which will automatically record carbon dioxide, draft, and stack temperature on the same chart 24 hours a day.

Pyrometry

How many know exactly the peak temperature of the porcelain enamel ware being fired in the furnace? The pyrometer of the furnace gives relative reading.

A development program was instituted years ago to find the relation between the thermocouple temperatures and actual ware temperatures.

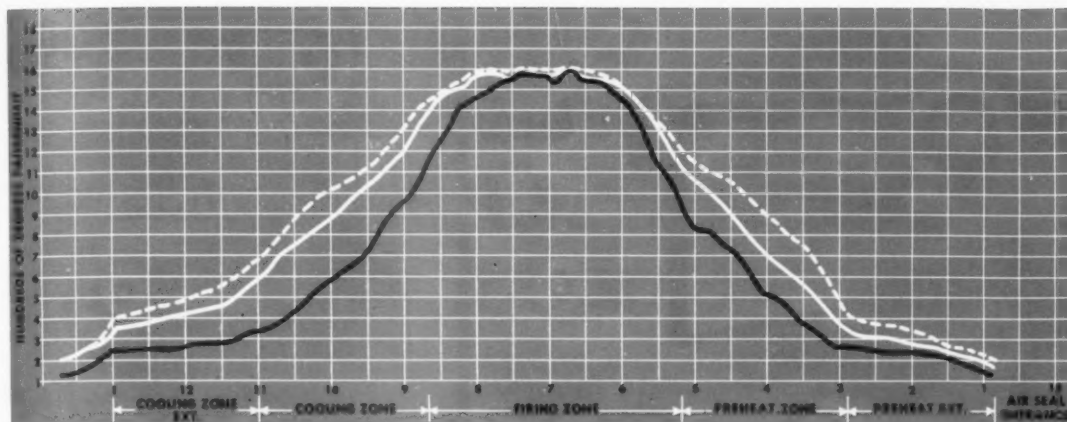
Porcelain enamel should be fired for a specified temperature and time. In establishing a firing curve we aim at uniformity throughout the entire cycle.

In box furnaces there may be 30° to 50° F. difference between the back of the furnace and the front. The thermocouples in the rear may be registering 1550° F. while the front of the furnace may be 1500° F. Many have found underfired and overfired ware in the same furnace. Also, trouble in colors is encountered because of incorrect temperature distribution throughout the furnace.

If the enamel is specified to be fired at 1550° F., no harm will result if it is fired between 1540° F. and 1560° F. There is a certain firing range for every enamel; firing at a temperature outside that range may



With an optical pyrometer, used to determine refractory temperatures in the fire box of an enameling furnace, arch temperatures of muffle-type furnaces may be measured periodically.



Unfavorable operating conditions are revealed in the above curves registered on the temperature gradient recorder. Three and one-third squares represent one minute of traveling time.

result in improperly processed ware.

The first point to check is the control thermocouple. This is accomplished by placing a standard thermocouple next to the control thermocouple, and checking by means of a portable potentiometer. If the control instruments read the same as the standard instruments, then the control system is working correctly. However, this does not mean that the temperature recorded by the control instrument is necessarily that of the ware.

To determine ware temperature, place a thermocouple in intimate contact with the ware. This is accomplished by drilling a hole in the ware and placing the thermocouple tip in the hole.

In a continuous furnace a rapid rise is necessary, and a peak temperature of one to three minutes, depending on the type of ware, is desirable. On a typical curve of a properly operating continuous furnace you will find this to be true.

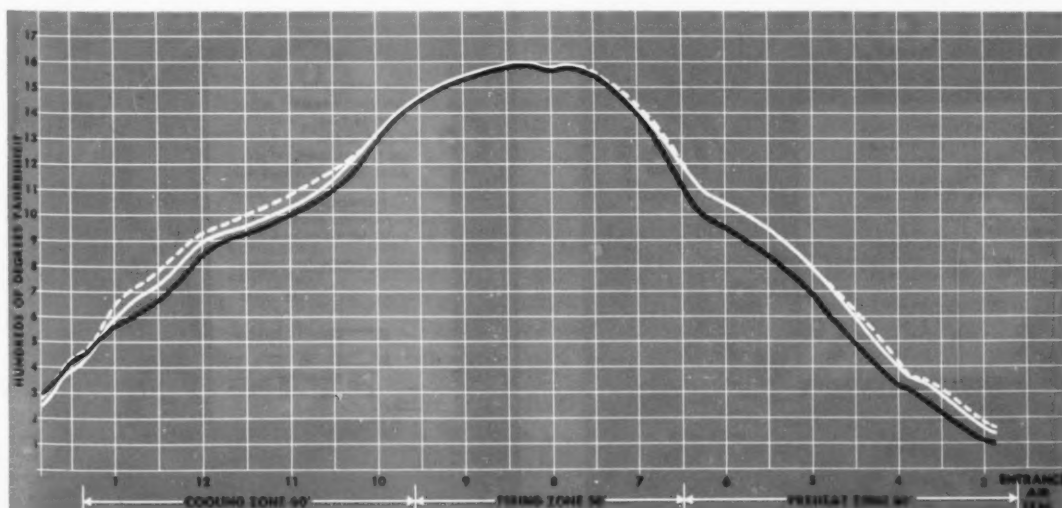
In the preheat a steep curve is desirable, because, if steel is oxidized for too long a period of time, more iron oxide is formed than the ground coat can absorb, resulting in copperheads.

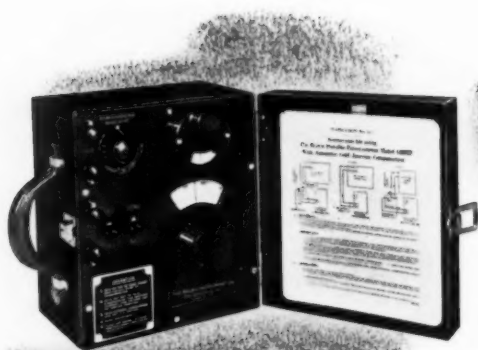
A relatively flat peak temperature curve is necessary. A short duration peak is to be avoided because the enamel does not receive its proper soaking time. Therefore, one to three minutes peak is recommended, depending upon the enamel.

Vertical temperatures should be correct. A refrigerator or stove panel should not be 1550° F. at the top and 1600° F. at the bottom while traveling through a continuous furnace, because the enamel does not receive its proper firing cycle. Warp-age results from uneven heating. Overfired and underfired ware on the same piece is possible if vertical temperature distribution is not correct.

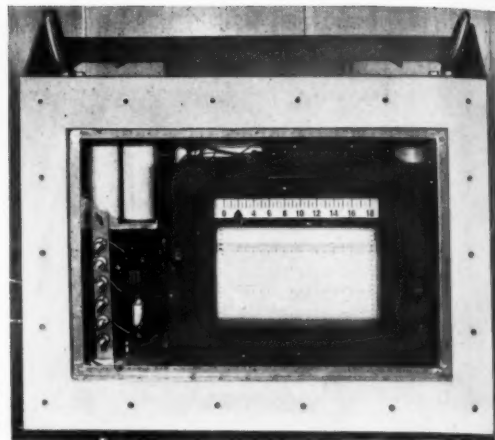
A commercial furnace, adjusted properly, should not have over 20° F. between top and bottom of the largest piece of ware that can be fired. We do, however, have furnaces in this country that are less than that, having only 10° F. difference between top and bottom. If between 10° F. and 20° F. from top to bottom is

Temperature gradient indicating favorable operating conditions in a porcelain enameling furnace.





Above: A portable potentiometer. Right: Temperature gradient recorder.



attained on a commercial piece of ware, these conditions are excellent, but a greater differential calls for adjustment.

Determination of temperature gradients

A few years ago we took long thermocouples, suspended them on the chain and ran them through a furnace, taking manual readings at every three feet of chain travel. We then plotted a graph which showed us our temperature cycle. To simplify this we developed an insulated box (see "Modern Instrumentation for Measur-

ing Temperature Gradients in Continuous Porcelain Enameling Furnaces, July, 1948, finish) inside which we placed a three-point recorder. By means of relatively short couples attached to the ware, temperature gradients were automatically recorded while the instrument passed through the furnace. The three thermocouples are connected to three sections of the ware, the top, center, and bottom. All that is necessary is to hang the box on a chain with this piece of ware and close a switch when the ware has entered the furnace. Three curves in three different colors

result, which is the temperature gradient of the furnace.

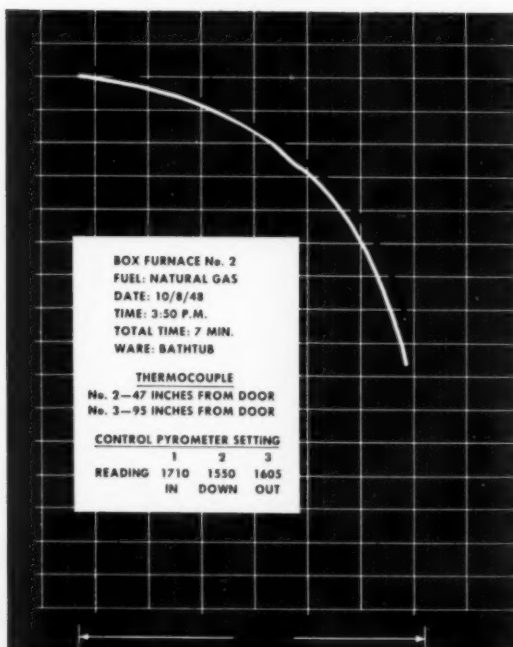
By examining these curves closely the exact temperature at the position of the control thermocouple on that furnace can be found and correlation is possible. If the temperature gradient is not up to specifications, adjustments must be made.

Proper burner requirements

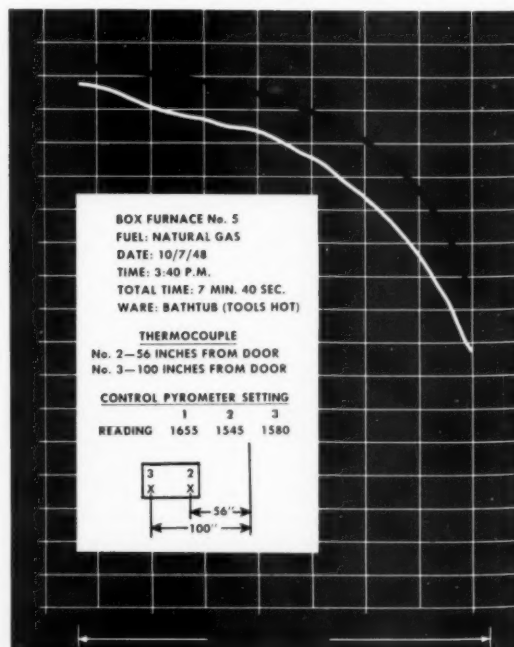
An important requirement in most furnaces is proper burner adjustments. The length of flame has a great deal to do with the heat distri-

to Page 56 →

Actual curve for box-type furnace operating under normal conditions.



Actual curve for box-type furnace operating under undesirable conditions.



Filtration for nickel and neutralizer solutions

including information on filtration, filters, filter aids,
and a detailed check list for filtration operation

by *Harold W. Faint*

FILTRATION DEVELOPMENT ENGINEER, INDUSTRIAL FILTER & PUMP
MFG. CO., CHICAGO, ILL.

IN this article, we will take up five points pertaining to the filtration of nickel dip and neutralizer solutions.

1. Why is filtration of these solutions required?
2. What benefits are obtained from adequate filtration?
3. What factors influence size of filters for adequacy?
4. A check list for filtration operation.
5. Filter aids (kind and quantities).

Why is filtration

of solutions required?

Discussing first the nickel dip solutions, the operation of a nickel dip solution involves the depositing of nickel on steel with the resultant formation of a precipitate known commonly as ferric hydrate. This is the familiar gelatinous reddish brown precipitate that sometimes has a darker hue in the actual nickel dip solution. The gelatinous precipitate should be removed as rapidly as it is formed so that it will not form a scum on the work which frequently causes difficulty in the enamel coatings that follow.

The neutralizer solution requires filtration to remove some of this ferric hydrate precipitate that has carried over into the neutralizer solution with the work. Filtration also serves to remove any excess nickel which, due to the alkalinity of the neutralizer solution, is also precipitated as a greenish white gelatinous substance. It also must be removed as rapidly as it is formed so that it, too, will not adhere to the nickel coating that is particularly desirable for the adhesion of the base enamel coat.

Benefits of adequate filtration

The benefits obtained from adequate filtration are principally those

of rendering the nickel deposit absolutely free from any dirt or adhering precipitates so there will be no subsequent trouble due to an unwanted chemical reaction between the ferric



HAROLD W. FAINT

hydrate or nickel hydrate and the base enamel coat. Enamellers can readily appreciate what would happen if these precipitates were to remain at the time that the steel with its nickel coating passes on to the enameling section of the line.

When these solutions are adequately filtered, there is a considerable saving in both time and money because you do not have to shut down to make up fresh solutions, thereby saving time. And, of course, if you have to make up fresh solutions you are spending more money for additional chemicals that are not necessary when the solution is adequately filtered.

Factors influencing size of filters

The factors that influence the size of a filter that will give adequate filtration are principally the number of

square feet of steel to be processed, the amount of nickel coating desired, and the volume of nickel dip solution that is available for processing this work. If you are operating a batch-type tank, the figures as to the number of square feet that are passed through the nickel dip solution in a given time are readily available from production data.

Likewise, if you are operating a continuous line you can also tell the number of square feet that are going through in an automatic conveyor where the work is dipped down into the nickel solution. The third type and the one that requires particularly careful figuring is the one in which the work goes continuously through a conveyor and has the nickel solution sprayed onto it, resulting in a tremendous amount of square footage of area processed for a relatively small amount of nickel dip solution.

These same factors also enter into the neutralizer, with the added word of caution that a neutralizer solution will not filter as rapidly as a nickel dip solution due to the alkalinity. It is a common piece of knowledge, of course, to all those who have had to filter both acid and alkaline solutions, that the flow rate of the solution through a given area of a filter is slower for alkaline solutions than it is for acid solutions. In estimating the area required for filtration, it is well to remember that a nickel dip solution will filter at approximately fifteen to twenty gallons per square foot per hour with the usual filter aids, and the neutralizer solution will filter at rates of ten to fifteen gallons per hour per square foot of filtration area under similar circumstances. →

**Table of Suggested Amounts of Filter Aid
for Nickel and Neutralizer Solutions**

Rubber-lined Filters				Steel Filters			
Fibrous Asbestos		Filter Aid	Area in Sq. Ft.	Area in Sq. Ft.	Fibrous Asbestos		Filter Aid
Alone	Mixed				Alone	Mixed	
1.25 oz.	.75 oz.	7. oz.	3.5	3.5	1.25 oz.	.75 oz.	7. oz.
3.5 "	1.75 "	14. "	7.	7.	3.5 "	1.75 "	14. "
5. "	2.5 "	20. "	10.	10.	5. "	2.5 "	20. "
9. "	4.5 "	36. "	18.	18.	9. "	4.5 "	36. "
12. "	6. "	3. lbs.	24.	24.	12. "	6. "	3. lbs.
19. "	9.5 "	4.75 "	38.	45.	22.5 "	11.25 "	5.5 "
30. "	15. "	7.5 "	60.	68.	34. "	17. "	8.5 "
3. lbs.	1.5 lbs.	12. "	95.	132.	4. lbs.	2. lbs.	16.5 "
3.5 "	1.75 "	14.5 "	115.	140.	4.5 "	2.25 "	17.5 "
4. "	2. "	16. "	130.	192.	6. "	3. "	24. "
5. "	2.5 "	21. "	170.	225.	7. "	3.5 "	28. "
7. "	3.5 "	29. "	235.	335.	10.5 "	5.25 "	42. "
9.5 "	4.75 "	38. "	304.	425.	13. "	6.5 "	53. "
13. "	6.5 "	53. "	425.	550.	17. "	8.5 "	69. "

Table is based on: (1) Fibrous asbestos material alone
 $\frac{1}{2}$ oz. per sq. ft. of area

(2) Fibrous asbestos mixed with diatomaceous filter aid
 $\frac{1}{4}$ oz. fibrous asbestos and 2 oz. filter aid per sq. ft.

Parenthetically, we would like to make the observation that in many of the pickling setups that the writer has seen, there is a woeful inadequacy of rinsing between the cleaner, the sulphuric pickle, the nickel dip solution, and the neutralizer solution. This means that there is a carry-over of cleaner into the sulphuric pickle thereby weakening it, a carry over of some oil and grease into the sulphuric pickle which gives a characteristic scum due to the oil that has not been completely removed, then carrying the sulphuric acid over into the nickel dip results in excess acidity in the nickel dip.

The next step is carrying from the nickel dip into the neutralizer without sufficient rinsing, which means that there is an excess of nickel dip solution carried over for the neutralizer to precipitate out the nickel. This may cause it to form scum on the surface of the work. Also, in a lot of corners there is inadequate draining of the alkali from the cleaner, the acid from the pickle, the nickel dip, and, all in all, results in inadequate cleaning on each step of the operation. Of course, we realize that sometimes there is a careful control of carry over and logical steps with regard to it. However, when one is designing a new plant or a revision of existing facilities, it is well to bear in mind that the water used for rinsing between various operations should be figured to do its job before a next operation comes along.

Assuming that you have a filtration unit that is adequate for the work ahead of it, and that you have placed it in operation and find that the system is not working in its normal way, we have the following "trouble shooting filtration check list."

The detailed check list of the many items in the filter and filtration sys-

Editor's Note:

This is the third in a series of three articles on filtration of solutions for paints and varishes, plating solutions, and pickle room solutions for porcelain enameling installations.

tem should be checked periodically, as well as when trouble is encountered, in order to have the system function properly.

Suction lines

Suction line from slurry tank: (should be of sufficient volume for proper flotation of filter aids into the filter unit, from 50 to 100% of the filter volume)

- (a) Is there valve control to start slurry into filter slowly?
 - (b) Was the filter filled with clean water first to permit checking the system for leaks?
 - (c) Are filter aids properly mixed and added to the slurry tank in proper amounts?
- Suction line from pickling or neutralizer tanks:

- (a) Is suction hose strong-walled

to withstand suction without collapse?

(b) Is there a proper screen over suction hose to prevent small metal parts from entering the hose and later the pump, with resultant costly pump breakage?

(c) Has the suction hose been so located in the tank to produce maximum circulation?

(d) If suction line is piping, are there any leaks in flanges or threaded joints?

Discharge

Discharge line to slurry tank:

(a) Is there valve control to regular flow?

(b) Can operator readily check clarity?

(c) Does return line reach below water level of slurry tank to prevent trapping a lot of air?

Discharge line to pickling or neutralizer tanks:

(a) Does discharge end of hose give full benefit to tank circulation?

(b) Is the hose secured to prevent "flopping" out of the tank with serious solution losses?

(c) Is provision made for checking clarity of filtrate periodically?

Valves

Gate and globe valves having packing in the stems that is subject to wear and replacement. Care in selection of new valves will prevent pipe-fitters from slipping bronze-seated valves into cyanide solutions. Rubber lined, rubber diaphragm valves require periodic inspection and every filter operator should know how to disassemble these valves to check the moving parts in the bonnet for proper functioning.

Hose clamps are absolutely necessary for all hose connections.

Filter unit

The filter unit should be assembled according to the manufacturer's instructions. Haste in the assembly of the unit is the worst possible waste of time. Every type of filter unit is designed for a specific method of assembly in order to get the best results from the unit.

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Measurement of surface roughness

Part I—instruments and methods used for comparing, measuring and delineating the surface profiles of metallic materials.

by E. Green • METROLOGIST, NATIONAL RESEARCH COUNCIL, OTTAWA, ONTARIO, CANADA

THE increased speeds at which sliding surfaces have been called on to operate and the close dimensional tolerances required of engineering products have necessitated comprehensive studies of surface structures. The studies have resulted in the development of instruments for comparing, measuring, and delineating the surface profiles of metallic materials.

The function to be measured

The basic conceptions of an imperfect surface⁽¹⁾ may be demonstrated by first taking the cross-section of a surface which is supposedly perfectly flat and smooth. A quartz or glass optical flat will approach this condition (Fig. 1A).

However, the surface is unlikely to be perfect over a large area. Let us imagine it is slightly deformed so

that over a 6" length it is .0001" hollow (Fig. 1B). Visually it will still be perfectly flat and smooth. If the number of hollows in the 6" length is increased but the depth still maintained at .0001" the surface will appear wrinkled (Fig. 1D). As the wavelength becomes smaller the ripples become more pronounced, and with the wavelength at a few thousandths of an inch the surface will be visibly rough (Fig. 1E). Hence, a smooth surface can be transformed into a rough one by merely reducing the wavelength of the irregularities. Naturally, the surfaces met with in practice will consist of undulations of different wavelengths superimposed on each other (Fig. 1F).

With only a few waves in the 6" length (Figs. 1B and 1C) the surface would not be considered as having a rough texture; the irregularities are

more geometrical or the surface is said to be wavy. The short period waves (Fig. 1E) could be classed as rough. Unfortunately, the transition point at which waviness becomes roughness is not easily definable. This question of wavelength and which wavelengths are to be considered as significant in the assessment of surface roughness is important when electronic instruments, used to measure surface roughness, are under consideration.

Methods of measuring roughness

The simplest and most primitive method of assessing the roughness of a surface is to look at it and to offer a personal opinion as to whether it is too rough to fulfill its designed purpose efficiently. The method may be refined by using the finger nail, a coin, a pin, or a pencil to scratch across the surface. With practice, and so long as the surface under test is neither too rough nor too smooth, a close comparison and estimate of surface roughness can be made.

The optical comparison microscope, having two objectives and a single eyepiece, offers a quick method of comparing the finish of a component against a standard specimen. The best results are obtained if the standard and the component are of the same material, finished by the same process, and of the same shape and size⁽²⁾. When using this type of instrument an operator can tell the process by which a piece has been finished.

The two surfaces being compared are viewed through the single eyepiece. Figure 2 illustrates the comparison of diamond turned, partially lapped, fine lapped, and honed speci-

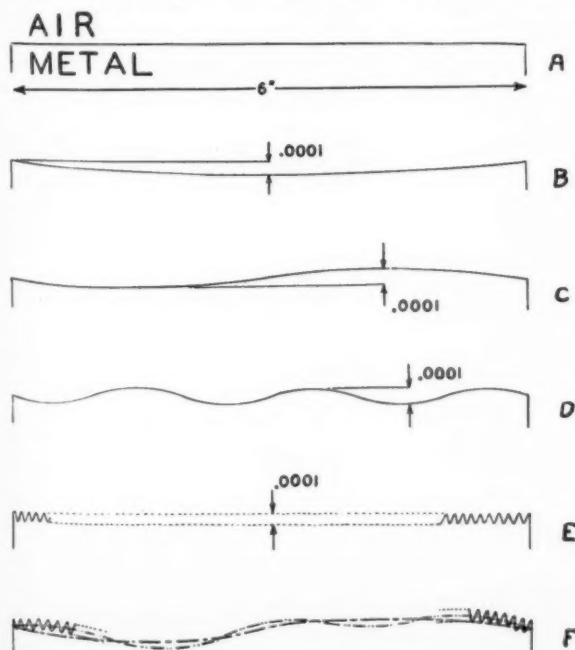


Figure 1 — Diagrammatic representation of an imperfect surface.

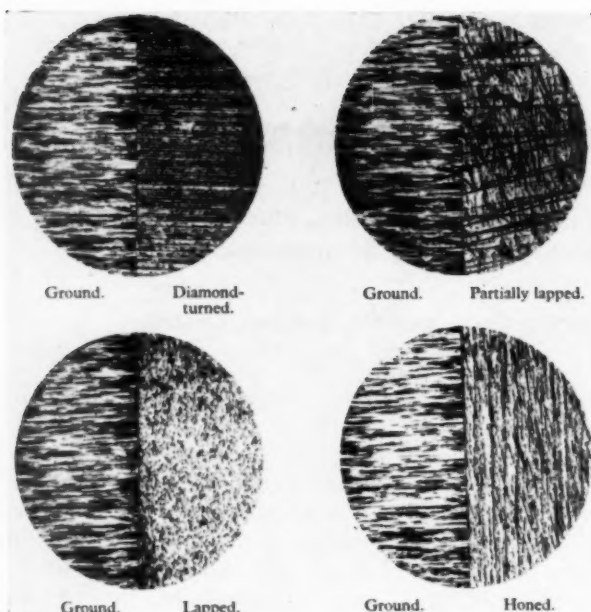


Figure 2—Comparison of four differently machined specimens with the same ground standard.

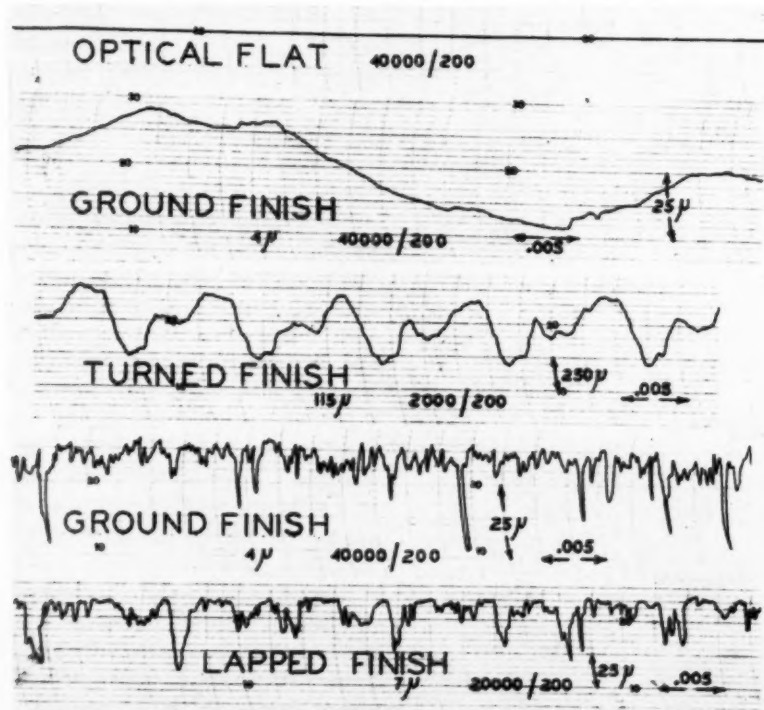
mens with the same ground specimen. The actual roughness values, as determined on a stylus type of surface analyser, are given in Table I, where H_{ave} is the average deviation of the surface contour from the centre line. (See section on stylus instruments.) The difficulty of assessing surfaces finished by different processes is obvious from a comparison of the honed

surface against the rougher, fine-lapped finish.

The limit of reliability of the comparison microscope is probably about 30 micro inches (1 micro in. = .000001 in.). The method does not give an absolute measure and the operator's personal opinion undoubtedly enters into an assessment.

Interferometry using shaped refer-

Figure 4—Traces, taken on a stylus analyzer, of machined finishes.



ence lenses offers a self-calibrating method of determining the heights of irregularities in fairly smooth reflective surfaces. A relatively large area can be inspected and the surface is not damaged. Unfortunately, the work is slow and, unless photographs of the interference bands are taken and carefully analysed, there is a possibility that the observer will note merely the larger irregularities on the surface.

The photograph of the interference bands formed by an etched glass standard and a reference lens⁽³⁾ is shown in Figure 3. The groove depth is 9 micro inches. The second photo-

Author's Note:

On illustrations in this article, except Figure 5, the symbols identifying the traces are on the material side of the trace. The magnifications of the trace are given as 40,000/200 (etc.) where 40,000 is the magnification in the vertical plane and 200 in the horizontal. μ is the symbol indicating the average micro (or millionth) inch deviation of the surface from an imaginary center line.

graph is of a burnished axle journal. The heights of the larger irregularities are within 10 micro inches.

Any future research work into surface roughness will probably use interference methods for reference purposes.

The stylus instrument, simple to operate, reliable, and generally independent of the operator's manipulative skill, has been favourably received by the engineering industry. These instruments give either a trace of the surface contour or a single numeric assessment of the roughness; some makes give both.

The "Talysurf" was the particular stylus instrument used by the author, at the National Research Laboratories, Ottawa, in some experiments on the roughness of painted surfaces. It is an electronic instrument and the stylus used is a 90° pyramidal diamond with a 0.0001 inch tip radius. The vertical movements of the stylus, due to the irregularities in any surface over which it is drawn, are amplified and applied to a pen recorder or an "average meter". Mag-

nification of the diamond movements in the vertical plane can be as high as 100,000x and in the horizontal plane (i.e. direction of traverse) 50x or 200x. The stylus pickup is carried by a rectangular shaft which is traversed in the horizontal plane by a driving motor. A ligament suspension supports the shaft so that any horizontal movement of the shaft is in a straight line.

In surface analysers the datum from which the diamond movements are measured is usually obtained in two ways. The first is by the use of a reference plane built into the instrument—in the “Talysurf” the parallel motion ligament suspension linkage is used for this purpose. Because the workpiece has to be accurately

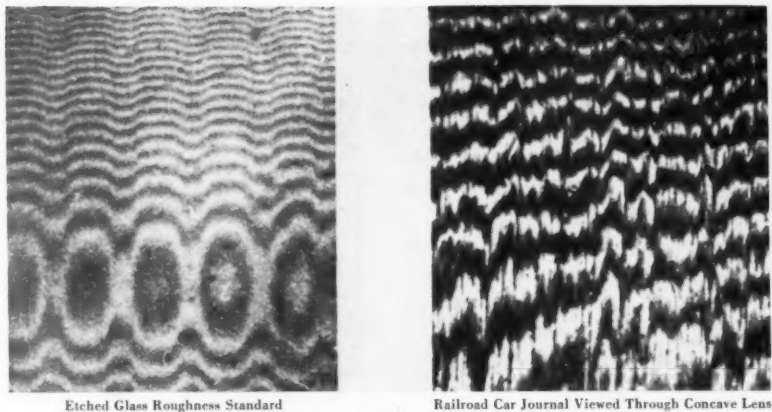


Figure 3 — Determination of the heights of irregularities by means of interference fringes.

characteristics which are dependent upon the cutting medium used (Fig. 4). The long period waves of the

and the total height about 27 micro inches. Machined finishes, depending on a single point cutting tool, exhibit regular wave forms, the pitch of which depends on the feed of the tool. The trace of the turned finish is typical of this class of surface. A trace across the highly directional, short pitched scratches of a ground finish exhibits sharp peaks. In actuality, each peak is not sharp but a relatively slow undulation because the different magnifications used in the vertical and horizontal planes give a distorted trace of the surface. A ground surface, subsequently lapped, may show plateau areas bounded

Table I

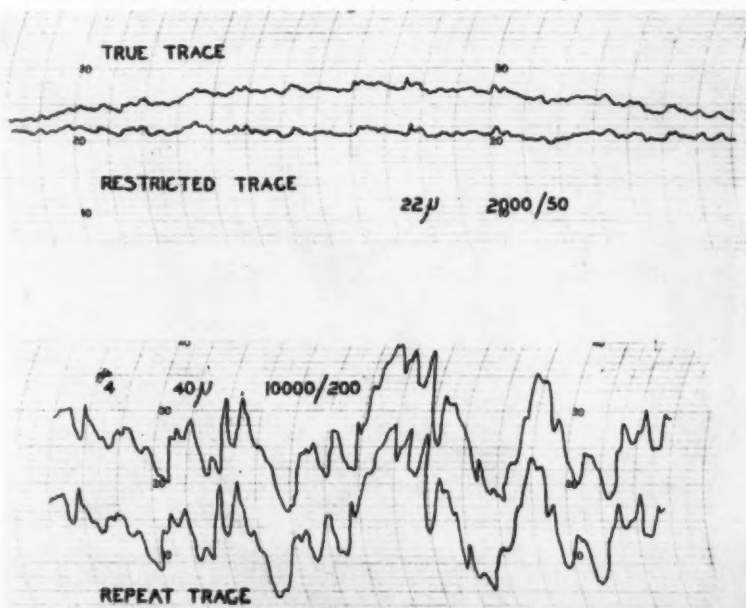
	Class No.	H_{ave} Micro inches
Fine ground standard	2	2.2
Diamond Turned Specimen	3	6.6
Partially lapped Specimen	1	1.7
Fine lapped Specimen	1	1.2
Honed Specimen	0	1.0

aligned with the reference plane, this method gives a rather low rate of work output. The second, and a very convenient method, is to use a surface datum device. The stylus pickup, instead of being rigidly clamped to the rectangular shaft as in the first method, is hinged at the point where it is attached to the shaft and its weight is taken at the other end by a rounded skid resting on an appreciable area of the surface under inspection. As the pickup is traversed across the work the skid slides over the surface, thus generating a datum from which the stylus movements are measured. Some pickups have the diamond in front of the skid, others have it behind the skid, whilst a third class has a pair of skids straddling the diamond. However, irrespective of the position of the skid, such a pickup merely gives readings of the relative movements of the stylus to the skid. This defect is not very serious because it results in the suppression of only the long period waves.

Machined finishes, when tested and traced on the stylus analyser, show

ground finish (2nd trace Fig. 4) are in the direction the grinding wheel was traversed across the work. The wavelength of these curves is .04 in.

Figure 5 — The true trace of a surface and a trace of same surface (upper) showing the irregularities measured by the meter. First and second traces (lower), over the same stylus path, on a painted surface.



by the deep grinding scratches which have not been totally removed by the lapping process. Any peaks shown on the trace of a lapped surface will generally have rounded crests.

The traces (Fig. 4) conform very closely with the hypothetical curves (Fig. 1).

The grading of a number of components into their roughness classifications from an analysis of graphical traces of their surfaces is not in phase with continuous production processes or quality methods. The simplification of the determination of the surface roughness has been achieved by fitting to stylus instruments meters which give a numerical indication of the deviation of the surface from a hypothetical centre line.

An unfortunate fact associated with

stylus instruments is that different makes give different meter readings from the same surface. This arises from two fundamental differences in design. The first difference, and of

Editor's Note:

Part II of this article, to appear in July *finish*, will show the possibility of adapting at least one of the devices described in Part I to the needs of finish technicians.

probably the least importance, is that some meters give the "root mean square" deviation from the centre line whilst others the "average" deviation. Meters supposedly giving the root mean square value, in all probability, do not give mathematical cor-

rect values of this quantity over the entire meter range; readings may vary from correct root mean square to about 1.1x the average deviation⁽¹⁾. The second difference in the instruments is in their selectivities. The longer wavelengths are excluded from the meter assessment, but the point of "cut off" has not yet been standardized by the different makers. Long period waves may be present in the surface as shown in the true trace (Fig. 5 upper). If, however, the response characteristics of the actual recorder circuit be made the same as those of the meter circuit, a restricted trace, showing only those surface irregularities assessed by the meter, is obtained. Such a restricted trace when compared with the true trace will show that the long period waves present in the true trace have been partially or totally suppressed. However, practical tests have indicated that components are generally given the same roughness classification number, irrespective of the instrument used.

Common practice is to state that a surface roughness is/or has to be so many micro inches, the figure stated being the reading of the meter on the surface analyser. This is very convenient if the following facts be borne in mind:

(1) The meter reading does not give any indication of the wave form of the surface. Traces exhibiting different characteristics can have the same meter reading.

(2) It does not give a measure of the total height of the irregularities—if a part has been turned we know the crest to trough height will be 3 to 5 times the average, for a ground finish 4 to 7 times, and for a lapped surface 5 to 8 times. In other words, the meter reading functions as an index—it is not an absolute measure of the roughness in the same sense as determining the diameter of a cylinder as so many inches.



"I'LL BE RIGHT OVER AS SOON AS I SLIP ON MY HAT!"

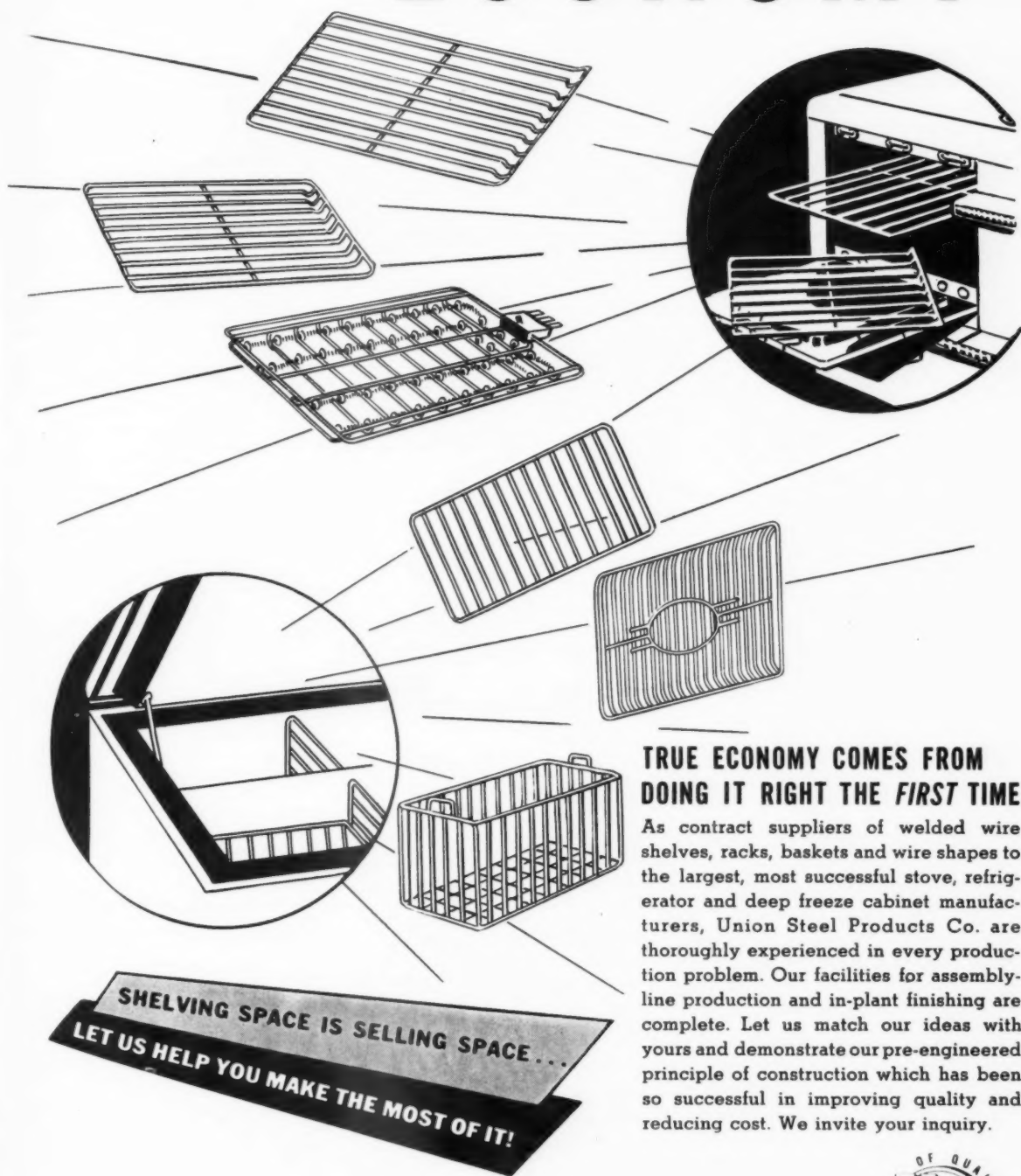
(1) Reason, R. E. — "Some Principles and Methods of Surface Measurement", Inst. of Mech. Engs. (War Emergency Issue No. 10) Conference on Surface Finish 1945.

(2) Schlesinger, G. — "Surface Finish", Report of the Research Department of the Inst. of Prod. Engs. 1942.

(3) Bryne, B. R. — Inst. of Mech. Engs. (War Emergency Issue No. 10) Conference on Surface Finish 1945.

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Five kinds of steel used in making refrigerator display cases

WHEN Wally Howard, factory manager, McCray Refrigerator Company, was asked to describe the different types of steel used in the production of refrigerator display cases at the company's Kendallville (Indiana) plant, he prepared the following short article.

Five different kinds of steel are used in the production cycle:

Hot rolled steel—angles, bars, rounds, sheets. Hot rolled steel starts with a hot ingot as it is taken from the open hearth and rolled while hot. It is not pickled to remove the scale. This type of steel is used where it is not exposed—where it doesn't show in the finished product.

Cold rolled steel sheets are such as have been hot rolled, pickled to remove scale, then re-rolled to produce smooth surfaced sheets comparable to glass in smoothness. In most instances, this type of steel is used for exterior surfaces.

Galvanized sheets are processed through a hot dip process of lead and tin. This steel is used on interior surfaces, and the primary purpose is for use where rust prevention is necessary.

Galvaneal sheets are made at the mill by the same process as galvanized, except that these sheets are given additional heat treatment to remove the characteristic spangles and roughness of galvanized sheets. Galvaneal sheet steel, which has excellent rust resisting properties, may be used in exterior parts.

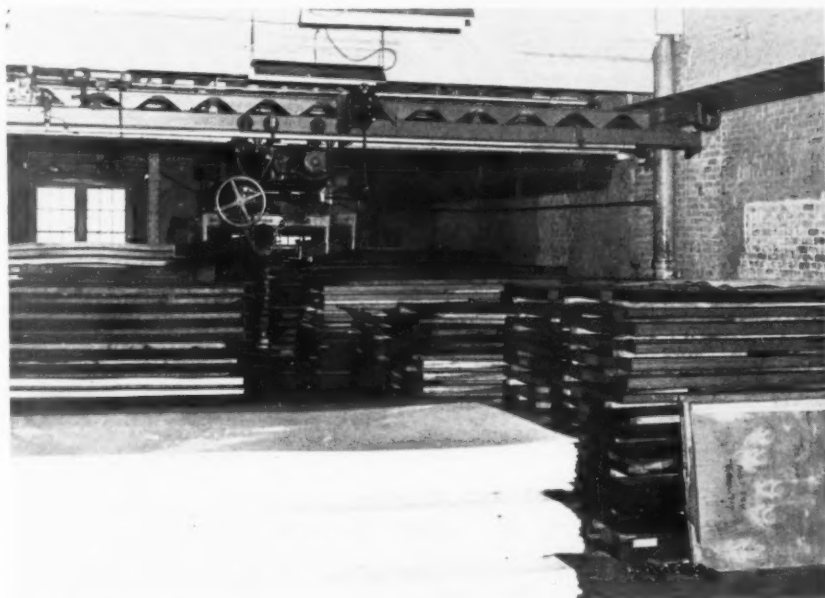
Enameling sheets of two different types are used. (a) Regular enameling iron which in most instances serves to make small parts for the display cases; (b) titanium steel which is excellent for large surfaces which must be free of warpage. The latter is used for such parts as the large food liners in reach-in units, and the tops for service meat cases.

In addition, stainless steel and aluminum are also used. Aluminum

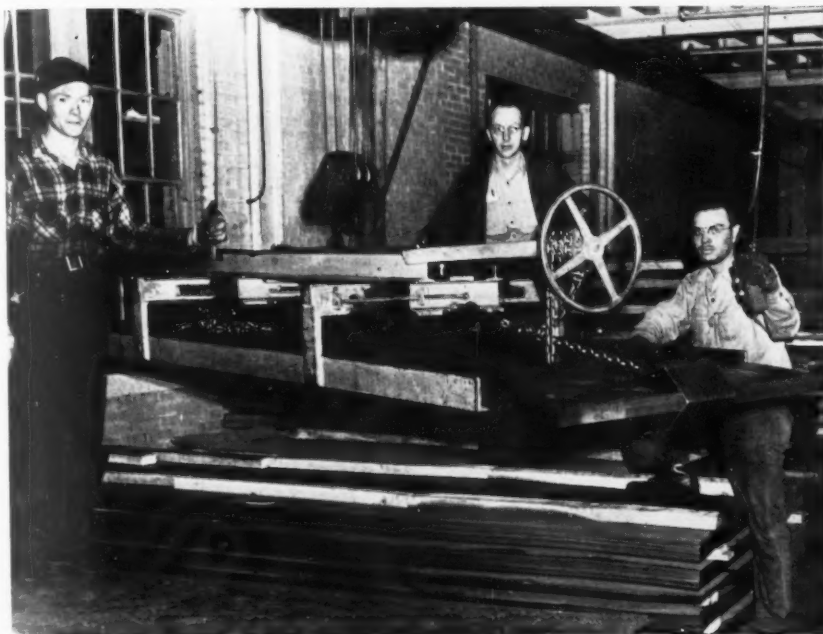
is used for shelves in self-service meat and dairy cases; stainless steel is used for the tops of a new line of self-service cases.

Most shipments of steel arrive at the Kendallville plant by open truck

and gondola cars. Sheet steel is inspected at the mill for the best side of the sheet, and it is standard practice that the side which carries the rolling mill stamp giving the heat numbers of the batch is the good side.



Above: Section of steel storage area. Below: Handling big steel loads.



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A thickness gauge for ceramic coatings

an electromagnetic method of measuring thickness of coatings (paint, plastic, ceramic, and other non-conducting films) applied on non-magnetic metal bases

REPORT OF A DEVELOPMENT BY *C. C. Gordon and J. C. Richmond*

• NATIONAL BUREAU OF STANDARDS, WASHINGTON, D. C.

AN instrument has been developed for the purpose of measuring the thickness of protective coatings of ceramic materials applied on non-magnetic metal bases. This instrument provides a non-destructive method of measurement and can be used on metallic backings having a wide range of electrical conductivities. Also, the thickness measurement refers to a restricted area and is, therefore, applicable to curved surfaces. Although this instrument was developed primarily for the measurement of the thickness of ceramic coatings on turbine blades and other high-temperature parts of aircraft power plants, it should be generally useful in thickness measurements of paint, plastic, and other non-conducting films.

For measuring the thickness of a coating applied to non-magnetic metal, an electromagnetic field of appropriate frequency is the basis of operation for the method.

The electromagnetic method is based on the change in inductance of a coil due to the proximity of a metal

surface to which the coating being measured is affixed. The basis for this change may be visualized by considering the metal surface as a short-circuited secondary winding which is coupled to the probe coil, or primary. The inductance of the primary varies with this coupling and, hence, with the proximity of the metal surface.

The essential components of the measuring head for the instrument are shown schematically in Figure 1. The probe coil is housed at the lower face of the cylindrical plastic test head. A mechanical dial indicator is mounted in the upper end of the plastic cylinder, and a slender plastic rod affixed to the stem of the dial indicator passes axially down through the plastic cylinder and the coil to serve as a protruding feeler element. This rod is free to move axially. Its displacement is indicated on the dial indicator.

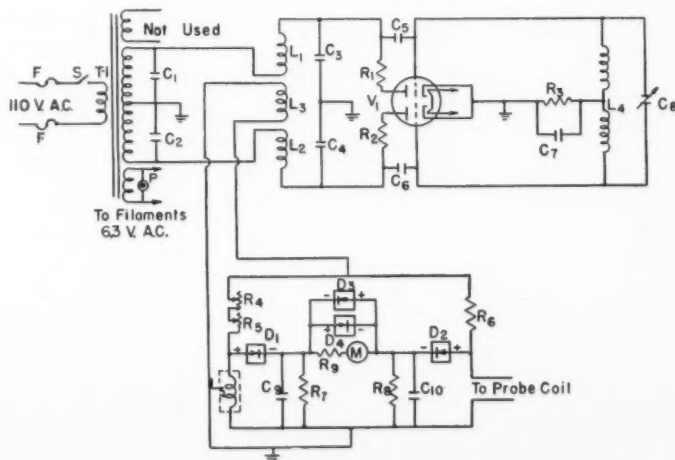
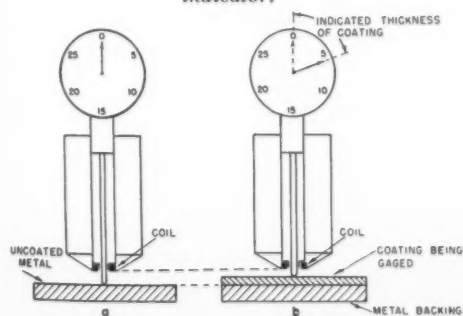
Figure 1a shows the instrument being calibrated against an uncoated sample of the same metal as the backing of the coating to be gauged.

With the feeler rod in positive contact with the metal surface, the indicator dial is adjusted to zero by loosening the lock screw on the dial indicator and turning the dial until the zero and the pointer coincide. The inductance of the probe coil is electrically established as a reference by adjusting the bridge-balance rheostats until the galvanometer reads zero. Subsequently, as shown in Figure 1b, a coated surface is introduced for measurement. The backing is of the same material as that for which the instrument was previously calibrated; its thickness and other dimensions may vary from those of the calibration sample within the (suggested) limits. With the material under test in place, the distance between the coil and the material is varied until the bridge is again balanced; this condition will exist when the coil is the same distance from the conductive portion of the material under test as it was from the material with which calibration was established; i.e., the spacing between the

to Page 61 →

Below: Figure 1—A simplified sketch of gauge head (a) in calibration and (b) in operation.

Right: Figure 2—Circuit diagram, 500-kc. oscillator and inductance balance indicator.



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Classification and definition of delayed defects in porcelain enamels

by J. H. Keeler, P. K. Chu and H. M. Davis

• DIVISION OF METALLURGY, THE PENNSYLVANIA STATE COLLEGE, STATE COLLEGE, PA.

THE wide range of terms used throughout the enamel literature emphasizes the need for a systematic classification and definition of the various enamel defects.

A natural division of enamel defects might group them into those of mechanical origin and those of physicochemical origin. The first category would contain defects such as damage from shock or bending, which result from faulty handling or any other source of mechanical strain. The second category would include defects stemming from reactions during firing, microstructure of the metal, evolution of gases, and other physical and chemical factors.

The physicochemically induced defects in enamels could then be subdivided into those forming at elevated temperature during the firing operation (copperheads, blisters, black specks, pinholes, and others) and the delayed defects which spontaneously appear at an indefinite time after the firing of the enamel. The controversial phenomenon of reboiling, which may or may not cause defects, deserves separate consideration.

The delayed defects are a particularly troublesome group. The terms "fish scale", "pop-off", "jumper", "shiner", "delayed fish scale", "shivering", etc. have been used to designate the various defects in this category. No one term is universally applied to any defect of specific characteristics, and a single term may indicate a number of varieties within the group. Thus, there is poor agreement on the identification of the several names with the several defects.

A study of the various delayed defects in several types of enamels applied as single coats to a number of steels has been used as the basis of

a tentative cataloging of the defects in this subdivision.

Shiner (typical example of a delayed defect)

A very close relative of the fish scale is what may appropriately be called a "shiner", a conchoidal crack meeting the surface of the glass but not resulting in the actual ejection of a fragment from the surface of the enamel. These cracks or shiners are defects which, unlike the fish scales, have relieved the causative stresses without the loss of enamel. They shine or reflect light because of the transparency of the enamel and the smooth surfaces of the crack.

These shiners or cracks in the enamel are generally indistinguishable from very small fish scales when viewed by the unaided eye. However, the differences between the two are

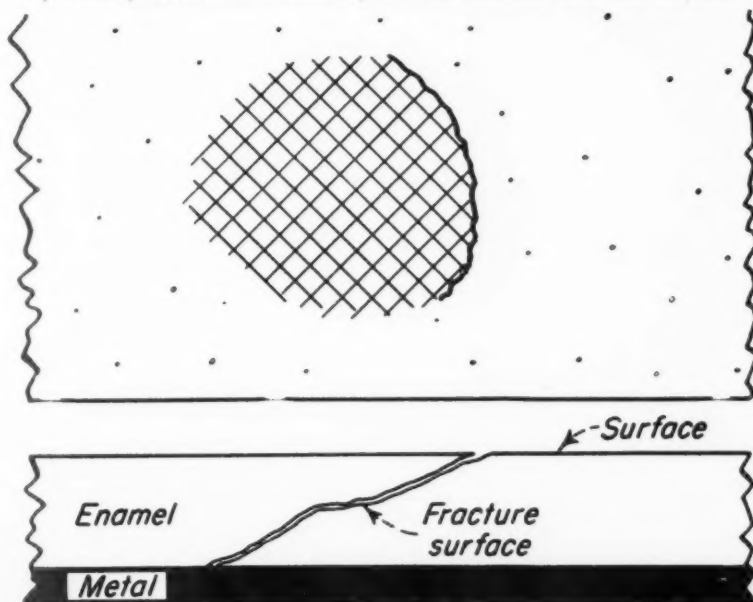
readily observable at magnifications of 5 to 20 diameters.

Typically, the intersection of one of these fissures with the surface of the enamel forms an arclike, curved crack that resembles a portion of the edge of a fish scale, as indicated in the accompanying illustration. If pressure is exerted on the glass on the concave side of this curved crack and directly above the bottom of the visible fissure, the enamel will usually spall in such a manner as to produce a typical fish-scale-like defect.

The presence of these cracks is not limited to ground coats or transparent coats, in which the shining can be observed. Opaque white coats sometimes possess such defects, as indicated by the presence of cracks in the surface of the enamel similar to that shown. Pressure applied beside these

to Page 60 →

Intersection of a shiner with the surface of the enamel. Cross-hatched portion symbolizes the location of the crack beneath the enamel surface.



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Record attendance at annual meeting of American Ceramic Society

NEW YORK CITY played host to a record attendance of ceramic men and their wives at the 52nd annual meeting of the American Ceramic Society which would seem to prove that in spite of the technical nature of the ceramic convention the pulling power of the eastern metropolis and its many points of interest remains powerful. A new attendance record of 2041 was established for this year's meeting held at the Hotel Statler according to the final tabulation by Society statisticians. Previous high attendance was 1877 at the 50th annual meeting held in Chicago. The "Windy City" will have an opportunity next year to pass the New York score as it will again play host in 1951.

While the New York theatres and night spots unquestionably received their full share of the ceramic industry's time and dollars, attendance at the technical meetings was notably good. Approximately 140 papers were presented, reporting on research

and advancements in the entire field of ceramics.

New president from whiteware industry

J. W. Hepplewhite, of Edwin M. Knowles China Co., was elected president of the Society. Howard R. Lillie, of Corning Glass Works, former vice president, becomes president-elect. Vice presidents for the coming year are: T. A. Klinefelter, U. S. Bureau of Mines; Aaron K. Lyle, Hartford-Empire Co.; Hewitt Wilson, U. S. Bureau of Mines. Treasurer is W. E. Cramer, Industrial Ceramic Products, Inc., and Charles S. Pearce retains the post of general secretary.

Sixteen technical papers presented before Enamel Division

The Enamel Division of ACS had the privilege of hearing some sixteen papers during the technical sessions. While some papers were admittedly beyond the comprehension of the practical enameeler, there seems little question that much valuable informa-

tion will have been added to the literature when the papers have all been published.

Joseph C. Richmond, of National Bureau of Standards, headed the divisional program with a paper by Richmond and Charles C. Gordon describing "A Thickness Gauge for Ceramic Coatings." Gauges for determining the thickness of ceramic coatings on magnetic metal bases are in common use, but the gauge described in this paper is designed to give measurements of coating thickness when the metal base is non-magnetic.

R. M. Williams, of New York State College of Ceramics, then presented a paper by Williams and H. E. Simpson on the "Effect of Lithium Oxide on Surface Tension of Silicate Melts." This paper together with a paper on "Corrosion Tendencies of Refractories for Enamel Smelters", by James H. Healy and Alfred W. Allen, of

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More photos Pages 40 & 41

Photo taken from behind registration desk shows some of the record crowd attending the convention.



own are one of the winners in the contest. They are (left to right): P. K. Chappin State, 4th prize; Alvin Wood Jr., North Carolina honorable mention; G. H. McIntyre, 3rd prize; DeLafayette Wal-Georgia Tech, 1st prize; William R., Georgia Tech, honorable men-annville, Georgia Tech, 2nd prize; Louis J. Van Houten, 1st prize, honorable mention. See story beginning on page 42.



TING OF AMERICAN CERAMIC SOCIETY



Above: New ACS officers are (left to right): J. W. Hepplewhite, president; A. K. Lyle, vice pres.; H. R. Lillie, president-elect; Hewitt Wilson, vice president; T. A. Klinefelter, vice president; and W. E. Cramer, treasurer.

→ from Page 39

University of Illinois, were primarily of interest to those who manufacture frit.

The theories surrounding the development of defects in porcelain enamels, particularly delayed defects, usually get their share of attention when technical men get together. A series of three papers by J. H. Keeler, P. K. Chu and H. M. Davis, of Pennsylvania State College, gave proper attention to these subjects. The three related papers were the following: "Classification and Definition of Delayed Defects in Porcelain Enamels," "A Study of Gases in Porcelain Enameling," and "An Examination of Reboiling." A fourth paper by the same authors served to show how properly controlled cooling of enameled sheet steel can prevent delayed defects. This paper was entitled "Distribution of Hydrogen in the Steel-Enamel System."

Five papers were presented by technical representatives of the various frit manufacturing companies. They were: "X-Ray Diffraction Study of the Oxidation Characteristics of Nickel Pickled Sheet Iron as Related to Enamel Adherence," by J. M. Zander and G. S. Douglas, of Chicago Vitreous Enamel Product Co.; "A Study of Fishscale Produced by Induction of Hydrogen into Enameled Iron," by E. E. Bryant, B. J. Sweo, G. E. Miller and M. L. Simmons, of Ferro Enamel Corporation.

"Results with the P.E.I. Adherence Meter," by H. W. Afflerbach and Clark Hutchinson, of Ingram-Richardson Mfg. Co. of Indiana, Inc.; "Some Factors Affecting the Opacity, Color, and Color Stability of Titania-Opacified Enamels," by Robert F. Patrick, Pemco Corporation; and "Some Further Observations on the Effects of Mill Additions on the Color Value of Titania Enamels," by Edward E. Marbaker, Mellon Institute, and Hollis S. Saunders and Leon N. Baumer, The O. Hommel Company.

Much publicized titania came in for its share of the spotlight in two papers. The first, an interesting color study, was by N. K. Russell, A. L. Friedberg and F. A. Petersen, of University of Illinois, and entitled "Effect

of Crystallized and Dissolved Titania on Colored Enamels." The second, dealing with compositions which can be fired at temperatures in the range of 675° to 725° C., was titled "The System $\text{Na}_2\text{O}-\text{P}_2\text{O}_5-\text{Al}_2\text{O}_3-\text{B}_2\text{O}_3$ as a Possible Base for Low-Temperature Titania-Opacified Porcelain Enamels" and authored by L. R. Blair and M. D. Beals, of Titanium Pigment Corporation. A third paper dealing with titanium-bearing enamels by Werner Heimsoeth, of Luverkusen-Beyerwerk, Germany, was programmed under the heading "Viscosity Studies of Titanium-Bearing Porcelain Enamels."

The West and Midwest were represented by an interesting paper on "Wetting Properties of Some Enamel Glasses and Relation to Impact Resistance" by W. J. Knapp, of University of California at Los Angeles,

and C. C. Shah and T. J. Planje, of Missouri School of Mines.

New division officers

Enamel division officers for the coming year include: Chairman, F. A. Petersen, University of Illinois; Vice Chairman; E. E. Howe, Lustron Corporation; and Secretary, E. E. Marbaker, Mellon Institute.

Materials and Equipment division officers are: Chairman, J. S. Nordyke, Eagle-Picher Co.; Vice-Chairman, C. M. Lambe, U. S. Gypsum Co.; and Secretary, Andrew Pereny, Pereny Equipment Co.

Refractories division officers: Chairman, P. G. Herold, Missouri School of Mines; Vice-Chairman, A. Paul Thompson, Eagle-Picher Co.; and Secretary, R. R. Rhodes, E. J. Lavino & Co.

NAME WINNERS IN CONTEST PROMOTING PORCELAIN ENAMEL

Last fall Ferro Enamel Corporation, through Dr. G. H. McIntyre, vice president in charge of research, announced a contest open to all students in ceramics or ceramic engineering, graduate or undergraduate, registered in schools and colleges in the United States and Canada.

The contest offered, for the best papers dealing with porcelain enameling technology, prizes totaling \$1000.00. The purpose of the contest, according to Dr. McIntyre, was to stimulate interest in porcelain enamel education. He said at that time that all companies benefit in proportion to the education given scientific workers and that therefore it is to the best interests of industry to foster education.

Winners in the Ferro contest were named at the 52nd Annual Meeting of the American Ceramic Society. Judges in the contest were Charles S. Pearce, ACS secretary; Edward Mackasek, managing director, Porcelain Enamel Institute, and Dr. McIntyre.

In a short ceremony following the morning session of the Enamel Division of ACS, on April 25, the winners were announced as follows:

First prize, \$500.00, Jesse DeLafayette Walton, Jr., Georgia Institute of Technology, "The Determination of Opacity by Means of a Translucency Meter."

Second prize, \$300.00, John C. Horsfall, University of Washington, "A High Temperature Porcelain Enamel for Tungsten."

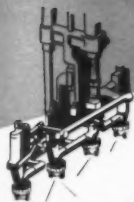
Third prize, \$100.00, Charles K. Russell, University of Illinois, "A Study of Effects of Decolorizing Agents on a Titania Opacified Porcelain Enamel."

Fourth prize, \$50.00, Gordon P. K. Chu, Pennsylvania State College, "Gases in Porcelain Enameling."

Fifth prize, \$50.00, James H. Healy, University of Illinois, "Solubility of Refractory Mill Additions in Fired Ground Coat Enamels."

Honorable mentions: William Brusse, Jr., Georgia Institute of Technology, "Reduction of Firing Temperature of Titanium Opacified Enamel"; Louis A. Van Houten, Iowa State College, "An Investigation of Enameling Clay"; Robert J. McEvoy, University of Illinois, "A Study of Spalling Found in Porcelain Enamel under Repeated Freezing and Thaw-

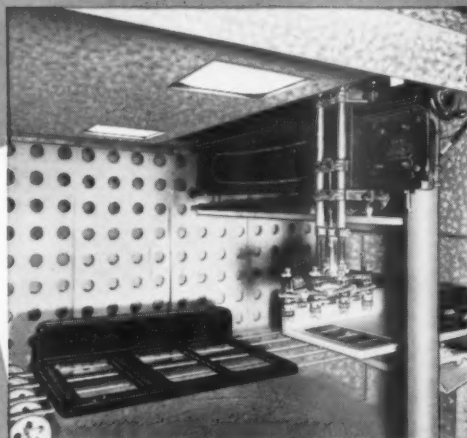
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Binks automatic spray machines

**FINISH YOUR MANY FLAT PRODUCTS
ECONOMICALLY...BETTER...FASTER**

If your product is adaptable to automatic finishing, you can **SLASH YOUR FINISHING COSTS** by the use of Binks automatic finishing machines—the hands that never tire. This type of equipment has revolutionized the finishing of many products. Not only has it reduced costs, but it has improved quality...cut rejects. The product to be finished is carried on a suitable conveyor past the spray guns. These start automatically, without dripping or spitting, and spray as long as the product is before them. The guns are turned off between units, thus saving paint.



Specially designed for ceramic finishes

Binks famous automatic reciprocating spray machine produces superbly finished panels and does them fast. The machine does all the work...never becomes fatigued...never stops to rest. Mechanical hands sweep the Binks spray guns back and forth across the panels. The only manual effort required is loading the conveyor belt...keeping the machine supplied with work. Flat surfaces such as table tops, refrigerator parts, outdoor signs, building panels, and range parts are a few of the many products that are finished fast and automatically by Binks automatic reciprocating spray machines.

Tungsten-carbide inserts protect guns

The Binks Model 7RV automatic ceramic spray gun, used on Binks reciprocating machines, is built of carefully chosen, wear-resisting materials. For example, tungsten-carbide inserts guard the needle valve and material nozzle from the abrasive action of frit. Included on this gun are all the features which have made Binks spray guns favorites with leading manufacturers in the ceramic field.



an invitation

If you would like to know what economies you can effect through the use of automatic finishing equipment on your products, ask Binks. Binks engineers will study your finishing problems in their new modern laboratory and give you a complete report. This service costs you nothing.

"Our major objective is to help you reduce your finishing costs and, at the same time, aid you in producing the finest possible finishes."

J. H. Roche
Chairman of the Board



**Send now for free literature
describing Binks automatic
spray finishing equipment.**



Binks

MANUFACTURING COMPANY

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DALLAS MILWAUKEE NASHVILLE PHILADELPHIA PITTSBURGH
ST. LOUIS SAN FRANCISCO SEATTLE WINDSOR, ONTARIO, CANADA

New Supplies and Equipment

F-1. Wipe-on method for stamped, engraved and etched parts

A semi-solidified paint in handy stick form, developed and compounded especially for wipe-ons or fill-ins of stamped, engraved or etched markings and designs on all types of smooth surface materials — metals, glass, ceramics, plastics, etc. Its value to manufacturers is its extreme quickness and ease of application. It is only necessary to rub the stick over the impression and wipe off the surface residue. The filled-in markings stand out clearly and distinctly at once and the part can be handled immediately without smearing.

F-2. Portable instruments



A new line of portable instruments, designated type P-12, is available. Rated in the two-percent accuracy class, the line utilizes both moving-iron and permanent-magnet moving-coil mechanisms in a compact molded case.

The line includes single and multi-

More Information

For more information on new supplies and equipment reviewed here, fill out the order form on this page.

ple models. Ammeters are available in full-scale ranges from 20 micro-amperes to 50 amperes d-c, and from 5 milliamperes to 50 amperes a-c. For d-c voltages, the full-scale ranges run from 10 millivolts to 800 volts, with a-c ranges from 1.5 volts to 300 volts. Rectifier milliammeters are available in full-scale ranges from 0.5 to 10 milliamperes, and rectifier voltmeters from two volts to 800 volts. The complete line is magnetically shielded to permit use of instruments on both magnetic and non-magnetic surfaces.

F-3. Fast-drying synthetic enamel

A new fast-drying enamel can reduce a manufacturer's finishing time by 40 per cent and cut his storage and handling requirements by 50 per cent, according to the producer.

The new synthetic protective coating is claimed to provide the hardness of a baked-on synthetic, but air-dries as fast as lacquer, in just a few minutes. It was designed particularly for plants which do not have baking facilities.

F-4. Dual fuel burners

A new line of dual fuel burners for combination gas-oil applications has

been especially designed for such rugged use as forging, heat treating,



smelting, kiln and drier firing with light or heavy oils and low pressure air as well as gas of any Btu content.

Of major importance in improvements is a new refractory tile which has been redesigned to give greater stability to the flame without the danger of carbon formations. The tile is shipped from the factory cemented and bolted to the tile mounting. This is said to simplify installation of the tile to the furnace and also to prevent the tile from separating from its mounting during operation.

F-5. A wide field industrial twenty-power microscope



A wide field industrial 20-power microscope with stand is now being produced. It is designed to withstand the rough handling of shop use. It is particularly valuable where work requires close and accurate checking of details as is the case with surface finishes, castings, machined threads, welds, and raw materials.

The microscope may be angled in any direction and raised and lowered to accommodate pieces up to 12 inches in height. Advantageous where

FINISH

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Chicago 1, Illinois

Please forward to me at once information on the new supplies and equipment and new industrial literature as enumerated below:

No. _____ No. _____ No. _____ No. _____
No. _____ No. _____ No. _____ No. _____
Name _____ Title _____
Company _____
Company Address _____
City _____ Zone _____ State _____

work is carried on in difficult "hard-to-get-at" places. The stand is portable and may be moved to the job.

F-6. Recycling timers for appliance and industrial applications



A new cam recycling timer is designed to repeat a given electrical "on" and "off" time cycle continuously. It consists of a heavy duty synchronous motor, an adjustable cam, and a single pole, double throw snap action switch—all assembled on a steel chassis to give a compact unit, 3-1/16 x 2-13/16 x 2-1/4 inches, which can be mounted against a back panel by means of four 6-32 screws.

In actual practice, the cam is adjustable for "on" and "off" cycles ranging from 2% to 98% of the total over-all time cycle. Over-all time cycles may be changed on these cam recycling timers by substituting different ratio gear and rack assemblies. Fifty such assemblies are available as standard equipment. Over 650 different time cycles—from one revolution in fifteen seconds to one revolution in 72 hours—can be obtained. The timer as adaptable for innumerable applications pertaining to process control, furnace heat control, defrosting, fan and blower control, pulsing, refrigeration, flashers and blinkers, testing equipment, oil burner control, soldering pot control, etc.

F-7. Portable greasing outfit

Two models of a portable "one man-one hand operating greasing outfit" for industrial use have been announced.

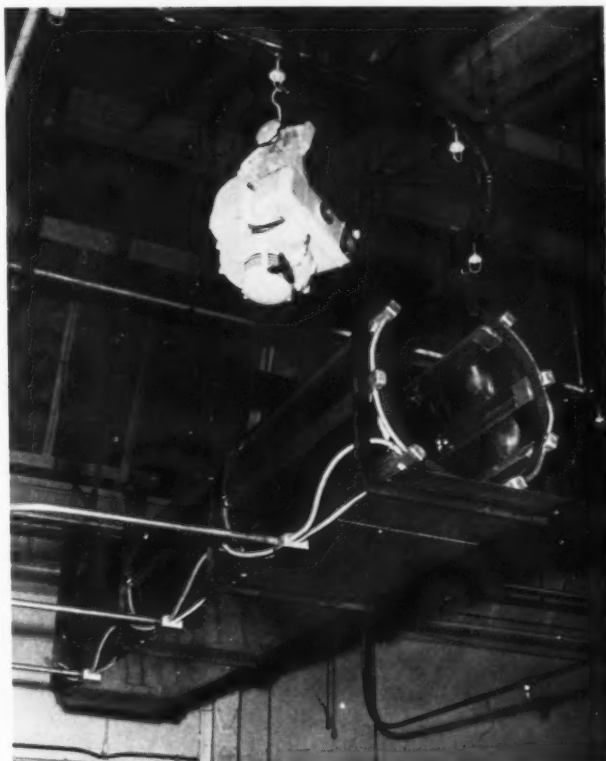
Two elements comprise this new greasing outfit—a loading and a grease gun. The loading pump is

mounted in a rigid steel cover which fits the top of any standard 25 or 35 pound size original lubricant bucket or pail, replacing the original container cover.

Pressure of grease delivery at the fitting is controlled by the operator

to fit the requirements of the bearing being serviced. It is claimed to be possible with either gun, by exerting extreme "push action," to effect up to 10,000 pounds per square inch delivery pressure on "frozen" bearings.

F-8. Space-saving aerial electric radiant oven



Two minutes of intense, zoned infra-red heat in a space-saving aerial electrical radiant oven provides rapid curing action and a hard true color to synthetic enamel sprayed on gasoline engines manufactured by a California firm.

No floor space at all is taken up by the baking operation. The all-metal infra-red oven, which is conveyorized, is said to deliver consistent results on a production basis with low maintenance cost and trouble-free operation.

Clearance inside the oven is 26 inches. Conveyor speed is constant at approximately 5 1/2 feet per minute.

For maximum drying speed at the proper temperatures, three zones of heat are provided in the oven, which is actually three ovens in one, made

up of three sections of 4-foot electric radiant heaters.

The first section through which the work passes is operated at full intensity for high initial heat and to bring the material very rapidly to the best drying temperature. Heat tapers off in the last two sections through the use of contactors and input controllers to maintain exact baking temperatures. Generally, the heaters in these two sections operate at 50% and 25%, respectively, of full capacity.

The compact ceiling oven—12 feet above the floor—isn't out of sight, but it is out of mind because maintenance is said to be a very minor factor; no breakage problem exists because of the all-metal heater construction.



ING-RICH HATCHES ITS OWN CHICKS

5 OTHER GOOD REASONS FOR USING PORCELFRIT

1. LABORATORY CONTROL—Our ceramic engineers maintain constant contact with the production staff to make sure of highest quality.

2. FEWER REJECTS—Now that we're back on a buyer's market, you have to watch your rejects. PORCELFRIT cuts them to a minimum.

3. IMPROVED SMELTING—Ing-Rich uses unquestionably the world's finest smelting method, the result of exhaustive research and experiment.

4. EXPERIENCE—Since 1901 Ing-Rich has pioneered in porcelain enameling. We have learned a lot in that time—and our customers profit by it.

5. SERVICE ENGINEERING—Our service engineers are available to make sure that PORCELFRIT works right for your product . . . You take no chances.

● It's *plant testing* that makes Ing-Rich PORCELFRIT YOUR SAFEST BUY!

Sure, we run complete and thorough laboratory tests. We could probably rely entirely upon the results of our laboratory experiments. *But we don't.* Once the laboratory is satisfied with a new development in PORCELFRIT, we put it to actual use in our own enameling department. We use it just as *you* use it. If anything shows up wrong, you don't pay the penalty—we do.

There's your extra safety factor. When you specify PORCELFRIT you *know* you're going to get a frit tested and proved under actual working conditions. Get your frit worries off your mind by ordering dependable, *plant-tested* PORCELFRIT!

INGRAM-RICHARDSON
MFG. CO. OF INDIANA, INC.



OFFICES, LABORATORY
AND PLANT
FRANKFORT, INDIANA

NEWS

STOVE MEETING, JUNE 5-7

This is a reminder that the annual convention and exhibit of the Institute of Cooking and Heating Appliance Manufacturers will be held June 5, 6 and 7, at the Netherland Plaza Hotel, Cincinnati.

REMA "SEAL OF APPROVAL"

FOR ALL HOME FREEZERS

"Cross testing" of home freezers by members of the Food Freezer Section of the Refrigeration Equipment Manufacturers Association is planned in the near future, and equipment so tested will bear a REMA "Seal of Approval", it was announced at the Association's annual meeting held in Chicago recently.

In the testing program, it was indicated that members of the section will ship their home freezers to other manufacturer members for testing under procedures set up by the group.

FORSSTROM HEADS ALLEGHENY

LUDLUM TRAINING COURSES

Appointment of E. H. Forsstrom to the newly created position of director of training was announced by C. B. Pollock, vice president in charge of production of Allegheny Ludlum Steel Corporation. Forsstrom was formerly assistant manager of the company's Watervliet, New York, plant. He joined the company in 1935.

W. J. Baldwin, chief metallurgist of the Watervliet plant, has been ap-

pointed to succeed Forsstrom as assistant plant manager.

AMERICAN STOVE NAMES

SALES SERVICE MANAGER

Harold V. Floerke has been named sales service manager of American



Stove Company, according to Marc W. Pender, vice president in charge of sales. He replaces E. H. Kahler, who became district representative in North and South Carolina.

Floerke will supervise the mechanical training of "Magic Chef" service and salesmen, and act as company "trouble-shooter" in various large scale service problems.

KITCHEN EQUIPMENT FIRM

ANNOUNCES APPOINTMENTS

Ing-Rich Metal Products Co., East Palestine, Ohio, organized less than

a year ago, has announced the appointment of the following officers:

J. F. Ingram, chairman of the board; E. E. Reagle, president; L. W. Ingram, vice president; D. L. Brooks, secretary and treasurer; and F. B. Reese, assistant secretary and treasurer.

Edgar F. Wainwright, formerly sales manager of the laundry and kitchen department of Hamburg Brothers, Pittsburgh, Pa., has been appointed Ing-Rich manager of sales, and is in charge of the company's kitchen cabinet and sink sales.

SUMMER MARKET, JUNE 19-29

The Summer Homefurnishings Market will be held in Chicago, June 19-29, at the American Furniture Mart, the Chicago Arena, and The Merchandise Mart.

H. A. FORSBERG DIES

Herbert A. Forsberg, vice president and sales manager, contract manufacturing division, Geuder, Paeschke & Frey Co., Milwaukee, died April 3. He has been with GP&F for almost 35 years.

ADMIRAL PLANS EXPANSION

OF NEW MIDWEST DIVISION

Admiral Corporation, which recently purchased Midwest Manufacturing Co., Galesburg, Ill., is planning an expansion program for this newly acquired division, according to John B. Huarisa, executive vice president.

Huarisa stated that public acceptance of Admiral's new line of full-length refrigerators, introduced last January, had been so great that the company would have to enlarge the manufacturing area at the Midwest plant from 265,000 sq. ft. to 365,000 sq. ft. to provide for further refrigerator production.

S. S. Battles, president of Midwest, will continue to head the operations at the Galesburg plant in the capacity of vice president of Admiral, it was stated.

Midwest, which employs 350 persons, will continue to manufacture its present line of Kitchen Kraft equip-

ment. It specializes in a package kitchen product consisting of a 5 cu. ft. refrigerator, sink, range, and wall cabinet, all contained in a space of 66 inches.

The plant at present is described as "completely modernized" for mass production, having 10,000 square feet of overhead conveyor equipment and four railroad sidings leading off the main line of the Santa Fe.

Midwest Mfg. began its corporate

life at Morrison, Ill., in 1934, as the Midwest Stamping & Enameling Co. In 1936, it was moved to Galesburg. Originally a manufacturer of refrigerators, which it marketed both under contract and its own label, it began production of steel kitchen equipment in 1940, switching to the manufacture of pyrotechnics during the war and to kitchen equipment exclusively in 1947.

ing quality finishes with less polishing and buffing expense.

ROY BECK WITH BINKS MFG.

The appointment of Roy D. Beck as manager, ceramic division, Binks Manufacturing Co., manufacturers of industrial finishing equipment, has been announced by Burke B. Roche, president. It was stated that Beck will be available for consultation to porcelain enamel and ceramic finishers in their plants and will also work closely with the Binks finishing method research department.

DE VILBISS OPENS WEST COAST PLANT

Howard P. DeVilbiss, president, The DeVilbiss Company, has announced that the firm will open a new assembling, warehousing and distributing plant in Santa Clara, Calif., about June 1. The new plant will serve the territory covered by the company's sales branches in San Francisco, Los Angeles, and Salt Lake City.

INLAND STEEL SALES APPT.

Robert M. Buddington has been named assistant manager of sales for Inland Steel Company's sheet and strip division, effective May 15, it has been announced. He succeeds W. P. Burke who resigned.

PHILCO TO HOLD INDUSTRY'S LARGEST SALES CONVENTION

Some 5,000 Philco appliance dealers from throughout the United States will be guests of Philco Corporation at a mammoth sales meeting scheduled for mid-June.

"Our forthcoming annual mid-summer convention to be held June 19 through 22, in Atlantic City, will be the largest sales meeting of this type ever held anywhere by one manufacturer," stated Raymond B. George, Philco sales promotion manager. "The importance of the announcements we will make at this convention will have such an impact upon every facet of the industry that we feel it is our duty to make a first hand report of these developments to

ELECTROPLATERS CONVENTION IN BOSTON, JUNE 12-15

Technical sessions of economic significance on means of reducing finishing costs will be a feature at the 37th Annual Convention of the American Electroplaters' Society — also the Fourth International Conference on Electrodeposition in collaboration with the Electrodepositors' Technical Society of Great Britain — at the Hotel Statler, Boston, Massachusetts, June 12 to 15.

The convention will be opened Monday morning, June 12, at which time Arthur W. Logozzo, AES president, will deliver his address of welcome.

The first educational session will be held Monday afternoon with Leonard E. Weez, National Lock Company, presiding.

Papers to be presented at this session will include: "The Self-Regulating High Speed Chromium Plating Baths" by Dr. J. E. Stareck, A. Mahlstedt and F. Passal, United Chromium, Inc.; "The Nodule Method of Measuring Adhesion of Electrodeposited Coatings" by Dr. A. Brenner and V. C. Morgan, National Bureau of Standards; and "Electroplating and Metal Finishing Developments in Germany" by Dr. R. Springer, Spezialwerk fuer Galvanotechnik Leipzig, Germany.

Tuesday morning's session will include: "Measurement of Surface Smoothness" by Dr. H. J. Kellner, Lea Manufacturing Co.; "Measurement of Surface Roughness with the Interference Microscope" by Arthur G. Strang and Fielding Ogburn, National Bureau of Standards; "Smoothing by Chemical and Electrochemical Polishing" by Dr. C. L. Faust, Bat-

telle Memorial Institute; and "Leveling with PR Current Plating" by George W. Jernstedt, Westinghouse Electric Corp.

Tuesday afternoon's session will include: "Leveling in Cobalt-Nickel Plating Solutions" by Dr. L. Weisberg, consultant; and "Surface Contour and Leveling" by A. H. du Rose, W. P. Karash and Dr. K. S. Willson, The Harshaw Chemical Company.

Wednesday morning's session will include: "Metal Finishing by Abrasive Tumbling" by H. M. Goldman, Enthone, Inc.; "Abrasive Belt Polishing" by E. E. Oathout, Behr-Manning Corp.; "Flat Polished Phosphate Coated Steel Reduces Polishing Cost" by H. J. McVey and V. M. Darsey, Parker Rust Proof Co.; and "Water Base Buffing Liquid" by E. T. Candee and S. L. Doughty, Jr., Lea Manufacturing Co.

Thursday morning's session will include: "The Reporting and Use of Research Data" by G. M. Cole, Ternstedt Division, General Motors Corp.; "Why Pay for Porosity Research?" by Dr. W. A. Wesley, The International Nickel Company; and "Use of Radioactive Isotopes for Determination of Current Distribution" by Dr. John Kronsbein, Evansville (Indiana) College.

A meeting of the board of directors of the National Association of Metal Finishers has been scheduled for Monday afternoon.

These are expected to be important sessions for all electroplaters, coming as they do at a time when rising costs are forcing manufacturers to explore all possible means of produc-

the leading retail appliance dealers of America."

New lines of Philco merchandise will be presented to the dealers and

the company's advertising and promotional plans for the fall selling season will be unveiled.

CRIBBEN & SEXTON HAS SOMETHING NEW FOR '51 — '50 PRODUCTION AT ALL-TIME PEAK



Here's one of the new 1951 Universal gas ranges and it can't be shown until next January. Cribben & Sexton headquarters personnel recently presented wooden mock-up models to division sales managers, but the curtain was lowered just as the cameraman snapped this picture.

Product and promotion plans for Universal gas ranges in 1951 were discussed at a recent meeting of Cribben & Sexton's divisional sales managers, according to Harold E. Jalass, vice president and general sales manager.

A basically new design and construction feature was shown to the group. This feature will be incorporated in some of the 1951 models which will be introduced at the Winter Homefurnishings Market next January.

Jalass announced that their plant is running at an all-time peak and productions schedules for the months ahead call for full capacity operation.

W. Cribben Wilkinson, assistant to the president, is shown in the photo lowering the curtain. Surrounding him (left to right) are: S. R. Hill, comptroller; G. D. Wilkinson, board chairman; H. E. Jalass, vice

president; G. Kamin, design engineer; J. A. Nelson, chief engineer; W. C. Davis, president; and H. R. Lehman, vice president.

ADMIRAL TO PUBLISH OWN CONSUMER MAGAZINE

As part of its stepped-up 1950 promotion campaign for its ranges, refrigerators and television sets, Admiral Corporation is planning to publish a bi-monthly consumer magazine, "America's Smart Set."

The publication will carry 24 pages each issue, with Admiral product-selling ads on the second, third and fourth covers.

Seymour Mintz, Admiral's advertising director, said that the editorial content of each issue will contain something for everyone in the family. Articles will cover interior decoration, budget food recipes, entertainment news and teen-age feature material,

and will be written for light, fast reading. Purpose of the magazine is to solve the problem of dealer promotional material, much of which seldom leaves the dealer's stockroom, said Mintz.

WESTINGHOUSE BUSINESS UP FOR FIRST QUARTER

Gwilym A. Price, president of Westinghouse Electric Corporation, told stockholders at their annual meeting in Philadelphia, April 19, that the company's first quarter earnings were ahead of last year's.

Price reported that net income for the first quarter this year was \$11,890,377, equal to 87 cents a share on the company's common stock. This compared with net income of \$10,866,921, or 79 cents a common share, in the first quarter of 1949.

Net sales billed totaled \$223,933,898, against \$226,658,722 a year ago; new orders received were \$229,985,567, compared with \$254,054,157 in the first three months of 1949.

PERFECTION INCREASES

PRODUCT PRICES

Prevailing conditions were given as the reason for moderate increases in products prices announced in late April by Perfection Stove Company.

According to D. S. Smith, Perfection's executive vice president, it was found necessary to initiate nominal increases in the prices of some of the company's products to keep pace with increased costs of coal, steel, and other items necessary to the manufacturing process.

"We feel that conditions justify this move", Smith explained, adding that the increases extend to such products as gas and electric ranges, and gas and oil furnaces.

HARVESTER REFRIGERATOR SALES UP 135 PER CENT

Unit sales of the refrigeration division of International Harvester Company for the last quarter of 1949 were up 99.4 per cent over the corresponding period in 1948, with refrigerators showing the greatest percentage increase—135 per cent, ac-

cording to T. B. Hale, vice president in charge of general sales.

Refrigeration sales for the quarter amounted to \$10,475,000, compared to \$6,823,000 for the like period in the preceding year, it was stated.

The company manufacturers refrigeration products in its Evansville, (Indiana) plant where initial production was begun in 1947. (See "A Continuous Furnace Enameling Plant for Refrigeration Products," December, 1948, finish.)

ernment or private laboratory on the subject of resistance welding. This paper should include the economic importance of the accomplishments described. As second prize, \$500.00 will be presented in this classification; and \$250.00 will be given to the third place winner.

For a paper emanating from a university or other educational source, which the jury feels has made the greatest contribution to the advancement and use of resistance welding, a prize of \$300.00 will be presented. \$200.00 will be awarded for the second best paper in this classification. A special prize of \$250.00 is available to an undergraduate who presents the best paper on resistance welding.

The contest, which closes July 31, 1950, is open to all from the United States, its possessions, and Canada.

\$50,000 CURTAIN WALL RESEARCH PROGRAM APPROVED



Members of the curtain wall committee, left to right, are: Leonard Nachman, Seaporcel; Dick Brownfield, Erie Enameling; A. C. Weierich, Davidson Enamel; and Jim Holcomb, Wolverine Porcelain.

At a Porcelain Enamel Institute-sponsored meeting in Cleveland, May 2, a \$50,000 project for developing a porcelain enamel curtain wall was approved.

J. A. Holcomb, chairman of the committee appointed by F. L. Meacham, PEI president, to obtain the research costs of such a program, submitted the report of the committee. The first step, covering a survey to evaluate the work done by the industry on curtain walls, will cost \$7500; the second, involving the design of a suitable construction to withstand necessary fire-testing and including the testing itself, will cost \$32,500; the third step, the preparation and distribution of a manual and the task of promoting acceptance of the construction, \$10,000—or a total of \$50,000.

The meeting voted upon and unanimously passed the committee's recommendations that this sum be raised and that it be apportioned among the enamellers, the frit manufacturers, the steel producers, and the suppliers in the ratio 1 : 1 : 1 : 1/3. President Meacham then appointed a financing committee composed of a member from each of these classifications

whose task will be to contact the membership of their respective groups to obtain their quota.

RWMA ANNOUNCES AWARD JURY FOR EDITORIAL PRIZE CONTEST

The Resistance Welder Manufacturers Association has announced that the five-man Jury of Award for their 1949-50 prize contest will consist of: W. E. Crawford, A. O. Smith Corporation, Milwaukee, Wis., chairman; W. E. Smith, Midland Steel Products Company, Detroit, Mich.; R. M. Wilson, The International Nickel Company, New York, N. Y.; B. L. Wise, National Electric Welding Machine Company, Bay City, Mich.; and Prof. R. A. Wyant, department of metallurgical engineering, Rensselaer Polytechnic Institute, Troy, N. Y.

The Jury of Award will judge the various papers which are submitted in the RWMA Prize Contest on resistance welding design, application and research. Prizes totaling \$2,250.00 will be distributed.

A prize of \$750.00 will be awarded for the best paper from an industrial source, consulting engineer or gov-

CHICAGO STAMPERS

DISCUSS WELDING PROBLEMS

Metal stampers in the Chicago area celebrated their group's first year of operation as a separate district of the Pressed Metal Institute at a dinner held May 10 at the Graemere Hotel. The group formerly was affiliated with the Milwaukee district.

Some 170 persons were in attendance at the meeting which opened in the afternoon with an exhibition of the latest welding equipment and techniques. Following the dinner, a panel of speakers answered questions from the floor regarding welding problems. The speakers and the welding fields in which they specialized are as follows:

Paul G. Feld, of Handy & Harmon, flux; Omer Blodgett, of Lincoln Electric, arc; Frank McGuire, Jr., of Linde Air Products, heliarc; E. V. Holt, of P. R. Mallory, resistance; R. P. Monroe, of National Cylinder Gas, gas; and Lawrence Jacobsmeyer, of Salkover Metal Processing, brazing.

SUB-LICENSES FOR BI-METALLIC COOKING WARE

Fairchild Engine and Airplane Corporation, Hagerstown, Maryland, has concluded a sub-licensing agree-

ment through its head licensee in Great Britain, Wellworthy Piston Rings Ltd., with Joseph Sankey & Sons, Ltd., of Bilston, Staffordshire. The agreement covers the use of Fairchild's "Al-Fin" process for bonding aluminum to steel and iron for the manufacture of bi-metallic cooking ware with 1/8" thick aluminum bottoms bonded to thin stainless steel for home, restaurant, and hotel use.

S. W. Farber, Inc., of New York, is the American licensee of the process for the manufacture of bi-metallic cooking ware in the United States. There are five other licensees using the patented process in other fields for the fabrication of bonded bi-metallic products.

HOLZBERGER TO HOMMEL

Glen J. Holzberger has been appointed sales and service engineer for



The O. Hommel Company in the Chicago territory. He was superintendent of the enameling plant at Estate Stove Company for 25 years, and is well known in the porcelain enameling field.

ACME STEEL PRODUCED "AT A RECORD RATE" FOR FIRST QUARTER

The annual meeting of the stockholders of Acme Steel Company was held in the company general offices in Chicago, April 18. In his message to the owners of the company, Carl J. Sharp, president, said, "For three months, we have been producing and

distributing our products at a record rate . . . Net sales for the first quarter of \$16,000,000 with a net income of \$1,600,000 . . ."

The owners were reminded by Sharp that "The products of our Strapping and Stitching Wire Divisions are bread and butter items" and that with the vigorous program of design and development engineering now in progress, these products should continue "to put fat on our bones in the future, as in the past".

SIGNODE UPS WILLIAMS

James R. Williams has been appointed sales promotion manager of Signode Steel Strapping Co., Chicago, according to a report. He joined the company in 1946 and prior to his new appointment was located in the Pacific Northwest territory.

WESTINGHOUSE STURTEVANT DIV. REALIGNS SALES DEPT.

The Sturtevant Division of Westinghouse Electric Corporation, Boston, has announced the realignment of its sales organization by the formation of two new departments: one to concentrate on sales of air conditioning products; the other, air handling equipment. Both departments will be under the supervision of J. C. Thompson, general sales manager. Newly-appointed manager of the air conditioning sales department is T. E. Smith.

The new air conditioning sales department will market its products in two ways, according to H. E. Seim, division general manager. Unit air conditioners, unit heaters and "Precipitron" home air cleaners will be sold through merchandising channels; while air conditioning compressors, condensers, chillers and large field-assembled installations will be marketed through engineering distributors, it was stated.

NEW GENERAL OFFICES FOR METAL & THERMIT

After 35 years at 120 Broadway, in downtown New York, Metal & Thermit Corporation is moving its general offices to the mid-town area.

The company's new address, as of May 1, is 100 East 42nd Street, New York 17, New York.

LIGHTNER CITED BY ASM GROUP

Max W. Lightner, manager of the research and development division of



Carnegie-Illinois Steel Corporation's research and technology department, has been elected by the Penn State chapter of the American Society for Metals to receive the annual David-Ford-McFarland Award for Achievement in Metallurgy.

Named in honor of Dr. McFarland, of Pennsylvania State College, the award was established last year as an annual recognition of the Penn State metallurgist who, in the opinion of the award committee, has brought the greatest credit to himself and his alma mater in the metallurgical profession. The presentation was made at a dinner meeting on Friday evening, May 5, at State College, Pennsylvania.

Lightner received his B.S. degree at Penn State in 1929 and his Master's degree a year later at Carnegie Institute of Technology. He then served for three years as research engineer on the metallurgical advisory board of Carnegie Tech. In 1933 he joined United States Steel as metallurgical assistant at the Homestead Works of Carnegie-Illinois.

FIBERGLAS EXPORT OFFICE MOVED TO NEW YORK CITY

Owens-Corning Fiberglas Corp., Toledo, Ohio, has announced the

moving of the general offices of its export division to New York City. It was stated that the move is expected to bring more effective sales results since New York is the center of export trade and the headquarters of many large engineering firms engaged in construction overseas.

Keith O. Grove has been appointed manager of the division, succeeding Gerard de Piolenc, who has been named assistant director of research of the firm's research and engineering laboratories.

PEI SALES, MANAGEMENT

CONFERENCE, OCTOBER 5-6

The Porcelain Enamel Institute has announced that its 4th annual Sales and Management Conference will be held October 5 and 6, instead of Oc-

tober 4 and 5 as previously announced. The two-day meeting will be held in Hotel Cleveland, Cleveland, Ohio.

METALLOY COMPLETES

LITHIUM BUILDING PROGRAM

Completion of a plant reconstruction and expansion program has been announced by Metalloy Corporation, of Minneapolis, Minnesota, Division of the Lithium Corporation of America. Increased plant facilities and the latest in extracting and processing equipment were major phases of the overall plan.

Purpose of the extensive rebuilding program, according to W. M. Fenton, sales manager, was twofold: (1) to solve the pressing need for added plant space, and (2) to answer the demand for more modern machinery

with faster output. The rapidly spreading industrial uses for lithium, and the partial damage caused by fire of existing plant facilities, were cited as reasons for the work. Plant operation is now on regular production schedules.

Metalloy's new production potential is considered by them as an important step in meeting increased demands for both lithium metal and compounds.

The election of A. B. Parnall as vice president-manufacturing, and Robert Wier Jr. as vice president-brush division sales of Osborn Manufacturing Company, manufacturers of industrial brushes, was announced by F. G. Smith, president.

COORDINATING COMMITTEE FOR DISTRICT

ENAMELERS CLUBS MEETS IN NEW YORK

THE Coordinating Committee for the District Enamellers Clubs met in New York City, April 25, at the Statler Hotel.

The meeting was attended by mem-

bers of three of the four active clubs. Those present included:

Eastern Club: Nathan Klein and G. H. Spencer Strong; Central Club: Paul Cecil and George W. Wood;

Midwest Club: W. A. Deringer, M. B. Gibbs, F. A. Petersen, Rudyard Porter, Marcel Pouilly, W. J. Plankenhorn, George Tuttle, and Dana Chase.

In addition the following were in attendance: John C. Oliver and George Warren, of Porcelain Enamel Institute; Charles Pearce, of American Ceramic Society; and T. W. Fenton, Canadian Ceramic Society.

Seated (clockwise) are: T. W. Fenton, Rudyard Porter, F. A. Petersen, G. H. Spencer-Strong; W. A. Deringer, W. J. Plankenhorn, George Warren, Paul Cecil, and George W. Wood. Standing (left to right) are: George Tuttle, John Oliver, Marcel Pouilly, M. B. Gibbs, Dana Chase, Nathan Klein, and Charles Pearce.



Following a luncheon in the club rooms of the Ohio Society of New York on the 17th floor of the Statler, a short business meeting was held. The original aims of the Coordinating Committee were briefly reviewed. The progress made toward the achievement of these goals was discussed.

Some progress was indicated with regard to program development resulting from an exchange of club information. Nathan Klein referred to the complete program on titanium enamel-titanium steel as sponsored by Westinghouse Electric Corp., including as speakers Messrs. Van Derau, Bisbee and Simons. This program has been presented before all of the clubs except the Pacific Coast organization. Information is being exchanged between the clubs which should lead to closer cooperation with regard to closer worthwhile program features.

The Midwest Enamellers Club (formerly the Chicago District Enamellers Club) was complimented on the quality of their recently adopted constitution and by-laws. Rudyard Porter's part in the drafting of this instrument was acknowledged. Nathan Klein and Paul Cecil, representatives of the Eastern and Central clubs, reported that the by-laws of the Midwest organization were being studied by their respective clubs. They anticipate that some action will be taken at the next regular business meetings of their clubs with respect to new by-laws.

Marcel Pouilly was appointed chairman of the Action Committee to keep in touch with each individual club through the respective secretaries to insure a complete interchange of information between all clubs. It was again stressed that a high degree of success in coordinating club activities could only be achieved through the regular exchange of information between all club secretaries. In effect, this places the secretaries of the several clubs as members of the Action Committee.

T. W. Fenton, of General Steel Wares, London, Ontario, attended the meeting as a representative of the

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use an
**INDUSTRIAL
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100 to 15,000 gallons per hour.
Portable and stationary models.
Standard or special filtration
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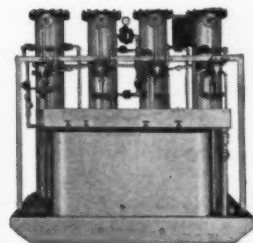
Here's how Industrial filters simplify clarification problems—The flow rates of Industrial filters are based on the actual solution involved. You know the capacity you get. In solution clarification there is more than just the filter. With Industrial you get an adequate filter with slurry tank, motor-driven pump, valves and fittings in a complete package with one, undivided, experienced responsibility—with space requirements at a minimum.

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WATER
DEMINERALIZERS

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Canadian enameling industry. He is a past chairman of the Enamel Division of the Canadian Ceramic Society. He reported that during recent years attendance at the sessions of the Enamel Division of the Canadian Society had grown from six to that of forty-five at the last meeting.

Members of the Coordinating Committee also attended the technical sessions of the Enamel Division of the American Ceramic Society during the week.

The next regular meeting of the Coordinating Committee will be held during the PEI's annual forum for plant men to be held at the University of Illinois, September 13, 14 and 15, it was announced.

HIGHEST SALES VOLUME IN ALLEGHENY LUDLUM HISTORY

Allegheny Ludlum Steel Corporation recorded the highest sales volume in its entire history during the first quarter of 1950. Sales and

revenues totaled \$37,551,378 during the quarter and resulted in net earnings of \$2,270,681, or \$1.67 per share of common stock after provision for preferred stock dividends.

PORCELAIN ENAMEL TO BE REPRESENTED AT MID-YEAR STOVE MEETING

A press time release informed *finish* that a special exhibit under the banner of the Porcelain Enamel Institute is being planned for the mid-year meeting of the Institute of Cooking & Heating Appliance Manufacturers to be held in Cincinnati, June 5, 6 and 7.

The exhibit will occupy Booths 58 and 59 in the North Hall of the Netherland Plaza Hotel. The theme will be developed to sell "modern porcelain enamel" and to point up recent developments in ceramic-type finishes which make them readily adaptable to a broader field of use within the heating and cooking appliance industry.

According to Howard Williams, of

Officials of the company pointed out that a substantial backlog of orders coupled with strong demand for its major products indicated a continuation of high level operations.

Pemco Corporation, chairman of the exhibit committee, the special exhibit is being sponsored by five major frit producers — Ferro Enamel Corporation, The O. Hommel Company, Ingram-Richardson Manufacturing Co., Chicago Vitreous Enamel Product Co., and Pemco Corporation.

WORK OF AMERICAN STANDARDS ASSOCIATION EXPANDS

A report and chart just issued by the American Standards Association show that the number of new and revised standards approved during 1949 was almost double the average number approved annually during speeded-up activity of war years.

It's MISCO for HEAT RESISTING ALLOYS
IN ROLLED MILL FORMS

Sheets — Plates — Rounds — Squares — Hexagons — Flats — Angles — Channels — Sections — Pipe — Nuts — Welding Rod

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MISCO
Rolled Heat and Corrosion Resistant Alloys

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We Have Over 200 Items of Heat Resisting Alloy Mill Forms in Warehouse Stocks Ready For You

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FLORENCE ANNOUNCES NEW GAS HEATER LINE



Florence Stove Company's new 1950 gas heater line includes three radiant-circulator vented models ranging from 35-65,000 Btu hourly input rating; three radiant-circulator unvented models from 12-30,000 Btu hourly input rating; and one vented circulator model with hourly input rating of 20,000 Btu.

More than five times as many standards were approved in 1949 as the annual average for the first 13 years of the Association's operation.

American Standards Association is a federation of 101 national organizations (technical societies and trade associations), many of which are well-known standardizing bodies with limited scopes of operations. Organization membership has increased nearly 30 per cent since 1938, it was stated.

DOLLARD GENERAL MANAGER OF STEEL FURNITURE COMPANY

P. M. Dollard, president of the Daystrom Corporation, chromed steel furniture manufacturer, has announced appointment of Theodore G. Hughes as general manager of all manufacturing operations in the company's plants at Olean and Friendship, New York.

Hughes joined Daystrom in 1946 in charge of production at the Olean plant. Before that, he was with Norma-Hoffman Bearings Corporation, Stamford, Conn., as factory manager, and with SKF Industries, Lansdale, Pa., as plant superintendent.

Previous to that he was with General Electric Company, Revere Brass & Copper Company, and Remington Arms Company in their tool and processing divisions.

PERMANENT STORE MODERNIZATION CENTER PLANNED IN NEW YORK CITY

Plans for the establishment of the first Store Modernization Center, aimed at centralizing interest in an annual 2-billion dollar market for new store equipment and building materials, were announced by John W. H. Evans, director of the Store Modernization Institute, sponsor of the Store Modernization Shows held the past three years.

The Center will house permanent exhibits of store modernization materials, and negotiations are now under way to lease 15,000 square feet of floor space in an air-conditioned building on Fifth Avenue to serve as

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WEBB TROLLEYS,
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CARRY THE WORK
THROUGH ANY
PROCESS—PAINTING,
PLATING, FINISHING,
FABRICATION AND
ASSEMBLY.

Again WEBB CONVEYORS Cut Costs!

Increased production, lower costs and better quality products were secured at this lawnmower plant when a Webb conveyor system was installed.

The mowers are now carried through the infra-red ovens at the rate of 88 per hour. The previous system handled only 50 per hour. Baking time was reduced from 15 minutes (with forced air drying) to 5 minutes with infra-red. And the net results of baked enamel are infinitely better. This is a typical example of Webb ingenuity and efficiency. It is a practical combination of know-how and modern materials handling equipment which is working wonders for American industry.

Illustrated bulletins fully describing Webb conveyor equipment for any type of materials handling will be mailed on request.



OFFICES IN PRINCIPAL CITIES

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DETROIT 4, MICH.

MANUFACTURERS OF OVERHEAD AND FLOOR TYPE CONVEYORS

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headquarters for the project. Exhibits will be open 5 days a week throughout the year to executives of retail stores and store architects and designers and builders engaged in the modernizing of stores, one of the most active building classifications in America.

The Store Modernization Center is a natural outgrowth of the Store Modernization Shows held in 1947, 1948 and 1949 at Grand Central Palace in New York. These shows have been attended by retail executives, chain store operators, architects and designers from each of the 48 States, all the U. S. possessions and 24 foreign countries. The sales success of exhibitors at the Shows has resulted in sufficient support from leading manufacturers to establish such a permanent exhibit as the Store Modernization Center in New York for their store equipment and materials, according to Mr. Evans.

CONLON-MOORE ELECTS OFFICERS

At the last meeting of the board of directors of the Conlon-Moore Cor-



poration, Monroe A. Toussaint, Algonquin, Illinois, was named vice-president of the corporation, according to B. J. Hank, president. Toussaint has been active in the industry for more than 22 years. Prior to his appointment as vice-president, he served as assistant to the president of the Conlon-Moore Corporation.

Other officers who were re-elected at the board of directors meeting:

B. J. Hank, president; H. T. Worthington, executive vice-president; J. M. Fox, vice-president in charge of sales; H. E. Angier, treasurer.

With factories in Cicero, Joliet, and Chicago, the Conlon-Moore Corporation manufactures household ironers, washers, driers, space heaters, and ranges. The executive offices of the corporation are in Cicero, Illinois.

HOTPOINT VICE PRESIDENT ELECTED

William A. Kissock has been elected vice president of industrial rela-



tions by the board of directors, Hotpoint, Inc., James J. Nance, president, announced. Kissock previously has been manager of the department, a position he has held since he joined the company in October, 1949.

Before joining Hotpoint he headed industrial relations for the Flintkote Co. at New York.

ELECTION OF OFFICERS AT VITRO MANUFACTURING

Vitro Manufacturing Company, Pittsburgh, has announced the election of new officers and new board of directors.

W. C. Rickerson has been elected the firm's new president and chairman of the board. Theodore Lenchner, formerly sales manager of the Ceramic Division, has been made a vice president. Herbert Fleck continues as vice president, R. T. Ruder as treasurer, and M. H. Ewing as secretary. A. J. Strod, former chairman of the board, has been made

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Avoiding enamel difficulties through proper furnace operation

→ from Page 24

bution up the side walls. In most cases, temperature recording on the control instrument agrees well with the peak ware temperature.

The control thermocouple can be relocated so as to obtain close correlation with peak temperature. With a gradient available, these factors can be interpreted quickly and accurately.

Importance of proper tooling

Another factor is proper tooling of the furnace. Usually ware fired does not take up as many Btu's as the tooling. Some sink and tub manufacturers have a tremendous amount of tooling in their furnaces. The furnace and tooling design have a great deal to do with the curve because of this factor.

If heat losses are excessive, an approved procedure is to baffle the furnace by means of Monel baffle plates. In the case of a U-type furnace this is not critical because of design. Baffles are important on straight through furnaces.

Check furnace

"fire box" temperature

One further point of control is fire box temperature. There have been many furnaces that literally burn down because of mass production far in excess of the furnace capacity. This is accomplished by excess fuel and extremely high temperatures in the combustion chamber.

Obtain an optical pyrometer and check the wall temperature of refractories. Be sure they are not over 2500° F. at any time; if they are, refractories will fail prematurely. If a furnace is operating properly, 2200° F. maximum should be the refractory temperature, especially in furnaces with a center wall.

Thus, by adherence to proper specifications of correct furnace operation, rejects can be minimized and difficulties in enameling avoided.

Adapted for *finish* from a paper before the Porcelain Enamel Institute annual forum for plant men.



American Porcelain can furnish top quality, trouble-free porcelain enamel frits that will save production money and at the same time give you the kind of product finishes you want.

A modern smelting plant and experienced field and plant personnel are back of every bag of APEC frit. We sell you the frit and we see that it works in your plant. APEC customers stay APEC customers.

Open the door for a demonstration of APEC frits and you open the door to new possibilities of increased production of fine porcelain enamel finishes at decreased cost per square foot of finished ware. Drop us a note today. You will get prompt and friendly attention.



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president of the Uranium Division and re-elected to the board of directors.

GAS SALES RISE IN MARCH

Total sales of gas by utilities to ultimate customers in March, 1950, were 4,215,314,000 therms, an increase of 27.9 per cent over 3,295,609,000 therms sold in March, 1949, the American Gas Association reported. For the twelve months ended March 31, 1950, total sales of gas amounted to 37,249,282,000 therms, a gain of 12.3 per cent compared with 33,181,032,000 therms sold in the comparable period a year earlier.

The Association's index of gas sales for March, 1950, was 317.2 per cent of the 1935-1939 average.

Klem Chemicals, Inc. has added two field service engineers to its staff.

Richard Collins, formerly with Harshaw Chemical Company, will work out of the main office at Dearborn, Michigan. Robert Furrow, formerly with the King Seeley Corporation, will be Klem's Grand Rapids representative.

SHROLL TO FERRO MICHIGAN STAFF

G. A. Hutt, assistant to the president of Ferro Enamel Corporation,

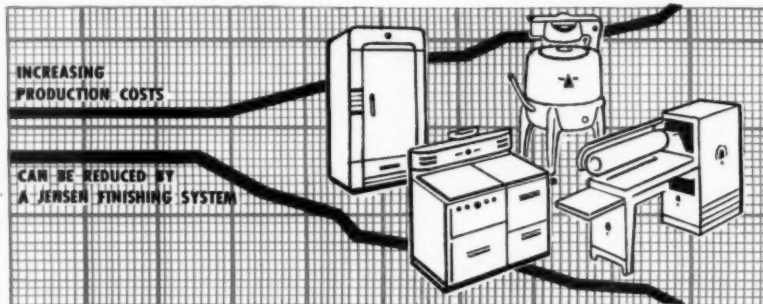
Cleveland, Ohio, manufacturers of porcelain enamels and equipment, announced the addition of Ivan H. Shroll to the Michigan Territory sales and service staff of the company. Until recently Shroll was employed in Ferro's Midwest Division in Chicago as a service engineer. Shroll will assist S. N. Smith, manager, Michigan Territory, and will reside in Grand Rapids.

Shroll's former connections include Norge Division of Borg-Warner Corporation, Benjamin Electric Manufacturing Company, and Geuder, Paesche & Frey Company.

NEW AMERICAN STOVE POST FOR EICHELSBACH

George P. Eichelsbach, Jr., was elected vice president in charge of

TODAY'S COMPETITION DEMANDS THAT YOU REVIEW YOUR FINISHING COSTS



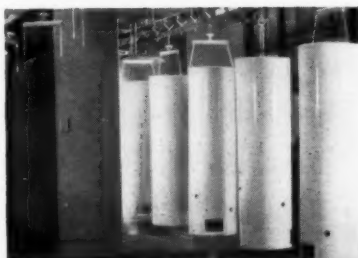
YOU MAY FIND THE WAY TO LOWER PRODUCT PRICES WITH A JENSEN FINISHING SYSTEM

Today, cost-conscious manufacturers whose operations involve low temperature baking, drying, preheating or dehydrating, are cashing-in on the money-saving advantages of infra red radiant heating *plus* coordinated conveying to be found in Jensen Finishing Systems.

Jensen Finishing Systems are engineered for economy—designed to increase production and minimize rejects; produce a uniform, finer, tougher finish, using less man hours, less floor space.

ABSOLUTELY WITHOUT COST OR ANY OBLIGATION TO YOU

Let us conduct laboratory tests on your products, using your finishes. Parts will be promptly returned for your inspection, together with recommendations to meet your production requirements. You get practical proof of every possible cost saving.



● Once considered impossible to accomplish with infra red, this Jensen "Dual Heat" nested-lamp oven dependably bakes a uniform white and ivory enamel finish on water heater jackets—delivers faster, better results, *plus* over-all economies. Have you an "impossible" job that needs doing? Let's discuss it.

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MANUFACTURERS OF ECONOMY-ENGINEERED RADIANT HEAT EQUIPMENT
"DUAL HEAT" INFRA RED OVENS • CONVEYORS • PAINT DIP TANKS



manufacturing at the annual American Stove Company board of directors' meeting, April 26, according to president Arthur Stockstrom.

Eichelsbach, formerly director of manufacturing, will continue as general manager of the company's plants in St. Louis, Indianapolis, Cleveland, and Lorain, Ohio, and as plant manager of the St. Louis factory. He has served in this capacity for the past several years. Eichelsbach joined the firm in 1935, following an apprenticeship as a journeyman toolmaker.

With the announcements is the information that production at the domestic range plant in St. Louis has been more than trebled—and is still rising.

AHLMA MEETS IN JULY

The summer meeting of the American Home Laundry Manufacturers Association will be held in Atlantic City, New Jersey, July 12, 13 and 14. Headquarters hotel is Haddon Hall.

Announcements of hotel and transportation arrangements will be made direct to the membership by the Association office in Chicago.

A record turn out of both members and their wives is expected, according to headquarters information.

SHERWIN-WILLIAMS INDUSTRIAL FINISHES APPOINTMENTS

G. L. Hehl, general manager of the Industrial Finishes Division of The



D. S. GAARDER

Sherwin-Williams Co., Cleveland, has announced the appointment of Donald S. Gaarder as assistant general manager and Lee Cotton as coordinator of technical operations for this important division of the company's activities.

Gaarder will assist Hehl in managing the Industrial Finishes Division, which deals with product finishes and finishing methods of producers, fabricators and reconditioners in the appliance, furniture, implement, automotive and many other industries.

Cotton will handle liaison between Industrial Division Headquarters at Cleveland and Sherwin-Williams Laboratories at Chicago, Newark, Dallas, Cleveland, Oakland, Los Angeles, and Gibbsboro, New Jersey.

The appointment of R. J. Hardy, Jr. to the research and development staff of Surface Chemicals, Inc. has been announced by Charles H. Groff, technical director. Hardy has been in the protective coatings field since 1941.

Gerald Kraft, sales manager of Kraft Chemical Company, Chicago 8, Illinois, has announced that the company has been appointed midwest sales representatives for Better Finishes & Coatings, Inc., Newark, New Jersey, manufacturers of paint, plastic and chemical products.

Kraft, distributors of industrial chemicals of all types throughout the

midwest, will carry substantial warehouse stocks of the Better Finishes line in Chicago, Detroit, and at other key points, according to the report.

BORG-WARNER ELECTS INGERSOLL PRESIDENT

It is reported that Roy C. Ingersoll, vice-president of Borg-Warner Corp., Chicago, has been elected president. C. S. Davis, who has been president for the past 21 years, has the newly created position of chairman of the board. Ingersoll also will take over duties of executive vice-president.

G. A. Shallberg, executive vice-president, has been appointed chairman of the executive committee.

NO SHUT DOWN

to carbon treat solution with . . .
horizontal

SPARKLER *plate* FILTERS

Only a few minutes are required to lift out the horizontal plate assembly in a Sparkler Filter and drop in a clean set of filter plates and production is under way without appreciable interruption.

Tanks are given a carbon treatment without shutting down production in the battery installation shown here. One or two filters are cut out of the line, drained, cleaned and dressed with clean filter papers. The proper amount of carbon is mixed with water in a stand-by tank and recirculated through the filters thus depositing the carbon on the plates in a cake of uniform thickness and density. The solution requiring a carbon treatment is then circulated through the carbon beds giving the plating solution the carbon treatment without contaminating the tank or stopping plating operations.

Sparkler Horizontal Plate filters give absolutely sharp filtration at all stages of the cycle.



A battery of 18 Sparkler Filters in one of the largest bright nickel plating plants in the world.



**SPARKLER
MANUFACTURING CO.
MUNDELEIN, ILLINOIS**

Name contest winners

→ from Page 42

ing in the Presence of Moisture"; John Calvin Welch, Jr., North Carolina State College, "Preparation of Low Temperature Enamels for Aluminum Metals"; and Manville J. Mayfield, Georgia Institute of Technology, "A Study of Single Fire Porcelain Enamel Brown Ground Coats on Sheet Steel".

Commenting on the judging of the student contest, Edward Mackasek, managing director of the Porcelain Enamel Institute, said: "The task of the judges in making the final selections in the Ferro contest was a hard one. The soundness of the student's basic thinking, his astuteness in selecting a problem that indicated a conception of an unsolved need of the industry, his ingenuity in devising a testing apparatus, the accuracy of his conclusions and the orderliness of his presentation were all factors that we duly weighed and considered before the final decisions were reached."

He added "The high quality of all

the entries was impressive to me and gives me the happy feeling that we have coming along in the porcelain enameling industry men who will carry on the great work that has been done in recent years to advance the progress of the product through

technological improvement and research."

Dr. McIntyre announced that his company will repeat the contest in 1951. Further announcements will be made through the ceramic engineering schools, it was stated.

Classification and definition of delayed defects in porcelain enamels

(Continued from Page 37)

cracks also can produce fish-scale-like defects. These defects, which do not reflect light because of the opacity of the enamel under observation, but which would reflect in a transparent enamel, may be identified as "latent shiners".

The classification and the identification of delayed defects of physicochemical origin in vitreous enamels on steel are probably best summarized in outline form.

Delayed defects of physicochemical origin

- (1) With good adherence
 - (a) Fish scale

Definition: a fish-scale-shaped fragment of enamel ejected from the upper glass portion of the coating, leaving the metal still covered; also the scar left in the enamel surface by the ejection of the fragment of enamel.

Characteristics: fish-scale-shaped; enamel fragment gone from the surface; metal unexposed.

(b) Shiner

Definition: a conchoidal crack in the enamel intersecting the surface, which reflects light but is not ac-

PORCELAIN ENAMELS—Cut costly extra handling, rejects, needless rework, expensive scrap.

Shrink total production costs—in spite of higher material and labor costs—by adding Lithium to your mill formula.

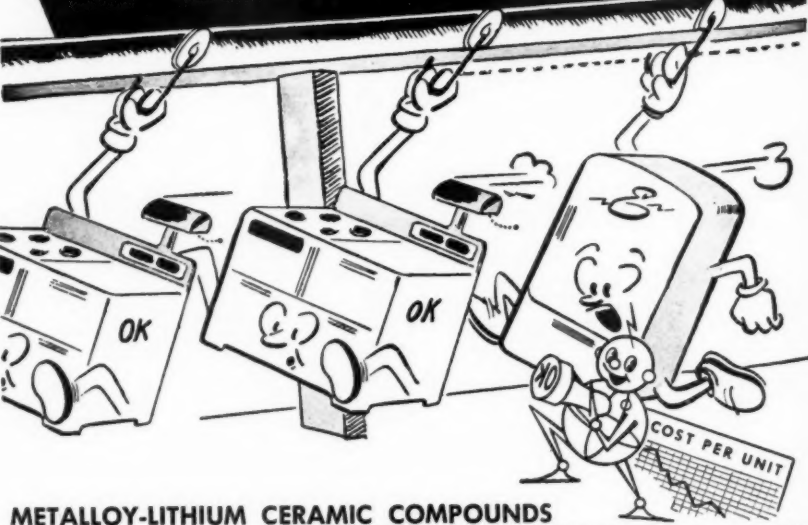
Metalloy-Lithium ceramic compounds give smoother, easier-working enamels—boost labor's productivity—lower firing temperatures—save fuel—eliminate warpage. Ceramic Lithium chemicals cost a few cents more, initially. But in the long run, they decrease the cost per square foot of O.K.'d ware and pay you back many times the initial cost.

Lithium may be the answer to your production problem. Investigate today by writing Metalloy, HEADQUARTERS for LITHIUM, Dept. FI.

If it's Lithium—Call Metalloy!

GREATER PROFITS

are yours when you reduce SCRAP... REWORK!



**METALLOY-LITHIUM CERAMIC COMPOUNDS
LOWER THE COST OF O.K.'D WARE!**

METALLOY CORPORATION

RAND TOWER

MINNEAPOLIS, MINN.

Division **LITHIUM CORPORATION**
OF AMERICA, INC.

accompanied by the loss of a fragment of enamel.

Characteristics: shines or reflects light; is a crack in the enamel; no enamel has been ejected from the surface.

NOTE: The same defect, when present in an opaque coat and thus non-reflecting, could be termed a "latent shiner".

(2) With poor adherence

(a) Pop-Off

Definition: a fragment of enamel ejected from the coating exposing the metal base; also the scar left by the ejection of the fragment of the enamel.

Characteristics: enamel fragment ejected; metal exposed.

(b) Bloat

Definition: a gas-raised area which has developed at room temperature in a finished enamel.

Characteristics: localized swelling or puffing.

(c) Splotch

Definition: an area at the metal-enamel interface, usually circular, diffusely reflecting when visible, and devoid of adherence between the metal and the enamel.

Characteristics: diffusely reflecting area at the metal-enamel interface.

It should be observed that these definitions were made on the basis of observation of single coats of enamel on sheet steel and are therefore somewhat simplified.

A comprehensive editor's resumé of a paper presented before the Enamel Division at the American Ceramic Society's 52nd Annual Meeting.

A thickness gauge

for ceramic coatings

→ from Page 35

coil and the upper surface of the backing is the same as that for calibration with the uncoated surface. Thus the feeler rod is displaced by the thickness of the non-conductive

finish JUNE • 1950

coating, which is directly indicated on the dial.

The instrument is limited to measuring the thickness of coatings on metal specimens at locations not more than 2 inches from the nearest edge. The specimen being measured is supported on the adjustable table of a microscope-type gauge stand. A micrometer screw adjustment permits this table, and also the specimen, to be moved relative to the test head assembly which is rigidly clamped

to the column of the stand. Substitution of another mount for the gauge stand would permit measurements near the center of large specimens. The associated electronic assembly, consisting of a power supply, an oscillator for energizing the probe coil, and a special bridge for indicating its inductance, is contained in a cabinet.

The thickness gauge was designed to measure coatings with a maximum thickness of about 0.090 inches.

IT'S EASIER
for an EAGLE to
Miss its Prey

than for a

FRANTZ FERROFILTER

to miss removing IRON from your
ENAMEL FINISHES

The eagle seldom misses its prey... but the FRANTZ FERROFILTER never misses... never fails to remove iron particles from your enamel slips. And under favorable conditions does its job even to a micron in size.

You Enamelers know how important it is to have your products present a glistening spot-free finish to pass inspection on the sales floor today. FRANTZ FERROFILTERS offer you the proven method of positive removal of iron, simply and economically.

If you have FRANTZ FERROFILTERS in your plant you know that they have lived up to all the claims we have made for them... that they have paid for themselves many times over in performance.

Why not check your millroom and other important production points to see where you can advantageously install extra units, so that you won't have to move your FERROFILTER from place to place. There's a size and model for every purpose.

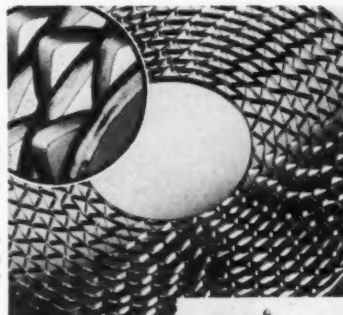
WET FERROFILTERS
Gravity-Pipeline-Underfeed
DRY FERROFILTERS
For dry process enamels and
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Authorized Representatives for the Enameling Industry

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**CHICAGO VITREOUS ENAMEL
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Above — The heart of this Electro-magnetic FERROFILTER is the patented grid illustrated, of which 16 to 30 units represent hundreds of feet of sharp, magnetized collecting edges.



Right — Gravity type FERROFILTER. Excellent for glaze, enamel, and general use. Light and portable. Made in four sizes.



PEMCO *Firsts*

- First Commercial Porcelain Enamels in the United States.
- First Wet Process Cast Iron Enamels
- First Colored Porcelain Finish for Gas Ranges
- First Installation of a Porcelain Enameling Department in a Customer's Plant
- First Leadless Enamels
- First Stainless Enamels
- First Polytone Finish
- First and only Wholly Continuous Smelter
- First Commercially Practical One Coat White Direct to Iron
- First Automatic Spray
- First Speed Fork
- First Antimony-Free Enamel
- First Complete Line of "Basic Oxides" for Porcelain Enamel
- Low Fired Ceramic Bodies
- First Producer of Micronized Clays
- First All Fritted Glaze
- First Over Glaze Colors
- and many others

And in Review...

In this, our Fortieth Year of Progress it is good to look back and review the impact of Pemco Development and Research on the Entire Porcelain Enameling Industry. Seldom do we find the progress of a business group so strongly influenced by one company. This, however, is understandable, if you will check the list of original Pemco developments on the opposite page. Compare these "originations" with products and practices now regarded as commonplace, in daily enameling plant production. Yes, Pemco has contributed in a very substantial manner to the Porcelain Enameling Industry as a whole, and to the individuals who constitute its makeup. And it is definitely our intention to continue this initiative—with the most modern and efficient production facilities and research and development laboratories in the industry . . . by creating and producing materials that will expand the use of porcelain enamels . . . by creating and producing modern finishes for modern finishing problems. Take nothing for granted. Before making your decisions, insist on knowing what is developing in modern porcelain enamels, to better your business and ours. Write, wire or phone Pemco today. They've a message you'll be glad to hear.

PEMCO CORPORATION

Baltimore 24,



Maryland

Always Begin With a Good Finish

The induction heater as a tool in fabrication

(Continued from Page 21)

stress relieving, soldering, etc.

Soldering with the induction heater, especially, is gaining in use rapidly in the plumbing and heating, refrigeration, and metal furniture and fixture industries. The process is used in metal packaging of foods. Soldering with the induction heater is akin to brazing in practice with the proper variables for melting point of the metal employed.

Stress relieving of kitchen utensils

One utensil manufacturer uses an induction heater for spot stress relieving of deep formed kitchen utensils. The portion of the utensil containing entrapped forming strains passes over a heating coil and is immediately raised to a temperature high enough to relieve the strains.

This process can be used between draws during actual forming of the utensil, and is much quicker and simpler than furnace stress relieving.

It would be futile and pointless to enumerate the many jobs that can be accomplished by induction heating in the various firms producing household equipment and appliances. Nevertheless, the process warrants thorough investigation by all who in any way would benefit from its use.

Though relatively new, induction heating is far beyond the experimental phase. Despite the seemingly "mystic" abilities to produce heat without visible evidence and almost instantly, the process can be controlled more precisely than older methods it replaces.

Filtration for nickel, neutralizer solutions

(Continued from Page 26)

The pump (usually centrifugal type) is the "heart" of a filtration system. If it fails to "beat" properly, there is no filtration. First test the freeness of rotation of the pump shaft (by hand and before starting the motor). This is necessary with the concentrated baths used today, for after the pump has been shut down for a while, salts may crystallize in the stuffing box and a sudden start may rip the packing, or score the shaft. Investigation shows that the majority of troubles with centrifugal pumps result from faulty conditions on the suction side. Except for mechanical trouble, nine times out of ten this is where to look for the cause.

Check List

No solution delivered

- (a) Priming casing and suction pipe not completely filled with liquid.
- (b) Speed too low.
- (c) Discharge head too high—check vertical head (particularly friction loss).
- (d) Suction lift too high (suction pipe may be too small or long, causing excessive friction loss). Handling cold water, total lift in-

cluding friction loss in suction pipe should not exceed 15 feet, or never more than $\frac{2}{3}$ total head.

- (e) Impeller or suction pipe or opening completely plugged up.
- (f) Wrong direction of rotation.
- (g) Air pocket in suction line.
- (h) Stuffing box packing worn.
- (i) Air leak in suction line.

Not enough solution delivered

- (a) Priming casing & suction pipe not completely filled with liquid.
- (b) Discharge head higher than anticipated—check friction loss.
- (c) Suction lift too high (suction pipe may be too small or long causing excessive friction loss). Handling cold water, total lift including friction loss in suction pipe should not exceed 15 ft. nor in any case be more than $\frac{2}{3}$ total head.
- (d) Impeller or suction pipe or opening partially plugged up.
- (e) Wrong direction of rotation.
- (f) Air pocket in suction line.
- (g) Stuffing box packing worn, allowing leakage of air into pump casing.
- (h) Air leak in suction line.
- (i) Foot valve not immersed deep enough.

Not enough pressure

- (a) Speed too low.
- (b) Air in water.
- (c) Mechanical defects: impeller damaged or worn.
- (d) Wrong direction of rotation.

Pump works for awhile—then quits

- (a) Leaky suction line.
 - (b) Mechanical defects: shaft bent; rotating parts bind, are loose or broken; bearings worn out; pump and driving unit misaligned.
- Currently, the two types of filter aids that are used most frequently in the enameling field for filtration of nickel dip and neutralizer solutions are: (1) fibrous filtering materials, principally of an asbestos base, and (2) diatomaceous earths which are frequently spoken of as diatomite.

Sometimes both of these materials are used together, and sometimes only one material. If the fibrous type of material that has an asbestos base is used, the customary amount is one-half of an ounce of this material per square foot of filtration area in the filter you are using.

If this fibrous material is used in connection with the diatomite, the formula becomes one-quarter of an ounce of the fibrous material and two ounces of the diatomite material per square foot of filtration area.

The advantage of using the fibrous material along with the diatomite is to provide a lacy structure that tends to spread the diatomite filtration powder satisfactorily and give it somewhat of a foundation and body with reference to the filtration.

The best uniform filtered cake is obtained by following these instructions:

1. Mixing the fibrous asbestos material with water to a thick paste.
2. Stirring the paste into a slurry of volume about equal to the amount of water that the filter tank itself would hold.
3. Pumping this slurry into the filter with a return of the filtrate to the slurry tank until all of the fibrous asbestos material has been transferred to the filter.
4. These same instructions would apply if you were going to use a combination of the fibrous asbestos material and the diatomite filter aid.

Do you know...



a bride...



or a graduate...



or a new baby...



or a birthday girl?

Chances are you're trying to dream up the perfect gift for one of these lucky people!

And what gift could be more wonderful for any or all of them—than a crisp U.S. Savings Bond!

Remember U.S. Savings Bonds pay \$4 for every \$3 at the end of 10 years.

U.S. Savings Bonds do not lose their value if

they're lost, stolen or destroyed.

They can be turned into cash in case of emergency.

So, settle your gift problems at your bank or post office—with U.S. Savings Bonds!

And while you're at it—how about some for yourself! They're a wonderful boon to your peace of mind!

Automatic saving is sure saving—U.S. Savings Bonds



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Carriers are cooperating to make Safe Transit effective

IT is the aim of the Carrier Coordinating Division of the National Safe Transit Committee to coordinate the activities of the carrier representatives in such a way that the furthering of the National Safe Transit Program and its objectives will be achieved.

On April 3, a meeting of the Carrier Coordinating Division was held in Cleveland, Ohio, and consideration was given to the part that the carriers will play and just how they may improve the loss and damage conditions as a supplement to the work the man-

ufacturers are doing in this direction.

Positive efforts are being made by the carriers to promote the Safe Transit program. Evidences of what is being done are included in the statements of the carrier representatives.

The Carrier Coordinating Division will continue to work toward encouraging carriers to participate in the Safe Transit program and to bring about the reduction of damage loss conditions for which they may be responsible.

all-out in testing their materials and in the packaged products. . . They are using the testing apparatus and as a result of these tests, in 1948 made 4,902 shipments with only 265 claims and in 1949 the same concern, by continually testing and improving their packing, had only 52 claims in 3,542 shipments, showing a decrease of approximately 95% in claims in three years. This is only one example of what can be done by the manufacturer and the carrier cooperating to improve the packing and handling.

In an effort to improve handling and to eliminate the human hazards which always exist where materials have to be handled physically, we have inaugurated a program calling for the expenditure of several million dollars to mechanize handling in certain platforms and facilities. It is realized that some facilities cannot be mechanized, but at all transfer points and large depots, these improvements are being made. These improvements include new roller conveyors, improved platform truck, and bulkheading light loads so they cannot fall from their original position when they are placed in a car.

The officials of the Railway Express Agency are 100% behind the Safe Transit program, and will continue in an all-out effort to improve the handling of all merchandise entrusted to our care.

What we are doing to promote Safe Transit

by A. E. Dowling • RAILWAY EXPRESS AGENCY, INC.

SINCE the inception of the Safe Transit program, Railway Express Agency has been a very active participant, and in 1948, in order to prevent the abnormal damage that was occurring to shipments entrusted to our care, the Prevention and Security Department was formed and has carried on a very intensive program in bringing to the attention of all employees all irregular handling and packing in an effort to reduce damage.

Combined with that, the employees of this department in the field have called on manufacturers of porcelain enameled parts and other materials, inspected packing and made suggestions that in a great many cases have resulted in decreased damages. Spot meetings are held on the platforms and at the different facilities of Railway Express Agency in the handling of employees, bringing to their attention all the irregularities discovered. Preventive action is taken immediately in an effort to correct these irregularities.

Realizing that the Safe Transit program is entirely voluntary and

that we have as much to gain as the shippers, an all-out effort has been made and will continue to be made by the General Claim Department (which replaced the Prevention and Security Department in July, 1949) to prevent any damage either through rough handling, poor equipment, or any other transportation cause as well as poor packing or inadequate packing.

As an example of the results of close cooperation of the shipper and Railway Express Agency, one concern in particular in 1947 made 4,908 shipments and presented 1,015 claims for damage in transit. With the inauguration of the National Safe Transit Program, this concern went

Educating our members about Safe Transit

by John M. Miller • AMERICAN TRUCKING ASSOCIATIONS, INC.

THE National Safe Transit Program was first called to the attention of our Freight Claim Council membership in our Freight Claim Bulletin No. 116, issued January 17, 1949. Subsequently at a meeting held

in St. Louis, on February 22 and 23, 1949, the program was outlined in detail, a representative of the National Safe Transit Committee appearing at that time and outlining the program fully.

The activities of the Committee have been fully reported in *Transport Topics*, our weekly publication, which goes to practically all motor carriers who would be interested in this program. The March 27, 1950, edition of this publication was designated as "Perfect Transportation Issue," and featured a one-page illustrated article describing the Safe Transit program.

In publicizing the program, very little emphasis has been given to the use of the Safe Transit Label for the simple reason that it was not believed that the program had reached the stage where such publicity to our carriers would be desirable. It is now clear, however, that sufficient participants in the program have been secured to justify fully explaining to our members what the Label signifies. A bulletin giving this information is planned for distribution during June. At that time we propose to publicize the name of those manufacturers who are participating in the program and needless to say it is obvious that the

Latest Certified Companies

Appliance Manufacturing Company
Alliance, Ohio
Belmont Stamping & Enameling Co.
New Philadelphia, Ohio
Central Rubber & Steel Corporation
Findlay, Ohio
The Dexter Company
Fairfield, Iowa
International Harvester Company
Evansville, Indiana
Murray Corporation of America
Scranton, Pennsylvania
Norge Division, Borg-Warner Corp.
Herrin, Illinois
Perfection Stove Company
Cleveland, Ohio

(see complete listing on page 80)

damage experienced on shipments of those not participating will be carefully scrutinized.

The various motor carrier Weighing and Inspection Bureaus and the local, state, and regional claim conferences affiliated with the A.T.A. Freight Claim Council are being acquainted with the program and urged to endeavor to secure the participation of appliance manufacturers in their areas.

We have always appreciated the need for careful handling of all ship-

finish JUNE • 1950

HOME APPLIANCES

PRE-TESTED
SAFE TRANSIT
SHIPMENT

NATIONAL SAFE TRANSIT PROGRAM

MAKE
SAFE HANDLING
YOUR JOB

HANDLE WITH CARE

Car placard designed by the Loading Research Division of National Safe Transit Committee for use by manufacturers certified by the Committee.

ments, but it will be our purpose to intensify our claim prevention activities and particularly to stress the importance of handling manufactured home appliance goods with extreme care.

During 1950, we are distributing over 100,000 claim prevention posters directed to securing more careful handling by carrier employees. Next year we expect to distribute an equal quantity. During the past year, we distributed over 30,000 Freight Handling Manuals which are being used in educating employees in proper handling. A sound slide claim prevention film is available to our members for employee education in proper handling. One of our affiliates in the Southwest has produced and is distributing a film entitled "Defeating Claims" which is being used extensively throughout the industry in employee education. Within the next month, A.T.A. will release another educational movie entitled "Handle with Care."

On January 1, 1950, we inaugurated our first National Claim Prevention Contest which will be an annual event. The purpose of this contest is to give national recognition to those motor carriers who establish a claim prevention program meeting certain basic established requirements. These carriers will be awarded a "Certificate of Merit" and the three carriers having the best programs will receive awards for "Outstanding Leadership."

It is believed that the fact that our industry's claim ratio for 1949 is estimated as being the lowest since 1941 indicates that we are making some progress in our claim prevention efforts. On the other hand, we are not satisfied that all that can be done has been accomplished. It will be our purpose to make every effort to increase our prevention efforts to the end that our shippers can rest assured that perfect handling is not only a promise but an integral part of motor transportation service.

What the railroads are doing to cooperate

by A. L. Green • ASSOCIATION OF AMERICAN RAILROADS

FOR the information of the National Safe Transit Committee, we have in preparation a series of posters

on careful switching. These posters will be in colors and, if purchased by the individual railroads in suffi-

cient quantity, will go to them once a month. This, of course, is only one phase of the attack that is being made on this serious problem. There were some nice reductions in damage to ware in LCL shipping last year, at least some of which must be reflected by the immense amount of educational work that is being done on the freight platform to promote more careful handling and safe stowage of these shipments.

... As to claim statistics, we now

have the complete figures for the year 1949 which will shortly be distributed to the National Safe Transit Committee; of course, with comparisons with 1948.

In considering the claim figures... it should be borne in mind that somewhere in the neighborhood of 60 per cent of the claims charged to the 1949 account are not on 1949 business at all—they cover largely 1948 and previous business. This means that a reliable conclusion as to the effec-

tiveness of the campaign cannot be drawn from the 1949 expense...

I think it is only fair to add that AAR's ceramic engineer, H. L. Cook, has been making many inspections of carload shipments and has run into many instances where damage was of manufacturing origin—such questions as defective design, enamel pop-off, etc. and where this condition is found it has been the general practice to send Mr. Cook immediately to the manufacturer's plant to offer his services in correcting the trouble. I would say that Mr. Cook has had the utmost in friendly cooperation and that his services have been of very considerable value to the manufacturers...

Safe Transit in Canada To Committee:

We have wasted no time in introducing our testing procedures to the Railways here in Canada.

Just previous to the visit of Mr. Angus of Canadian National Railways, Mr. Veines of the Canadian Pacific Railway looked over our test procedures. You can well understand our feeling in that we are quite confident in the results we are getting from our test procedures; as a letter signed by Mr. Angus, who is district freight claims agent, clarifies his view on just what Moffats are doing and the results that they will expect.

We have had so much success with our range crating that we are now going into an extensive testing program for refrigerators, and I feel confident that within another week or two we will have everything straightened out and I will be satisfied to put your labels on our refrigerator packages.

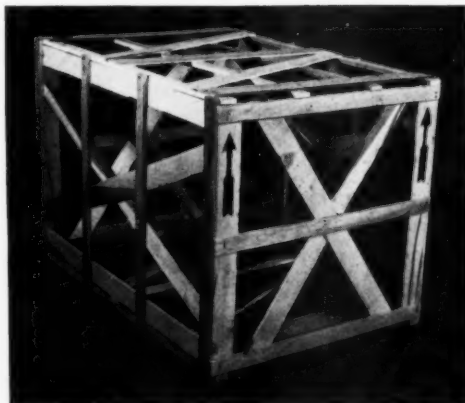
I want to point out to you that we are applying your labels only to packages which have been tested and we will not apply them to any package, which has had the least change in design, until it has been thoroughly tested.

R. W. Bosler
Executive Assistant
to Vice President
Moffats Limited
Weston, Ontario

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TIGHT CORNERS *with* B-G HINGED CRATES

The bracing strength and rigidity of the Bigelow-Garvey exclusive tight-corner design makes it possible for our Hinged Crates to withstand shocks, stresses and abuse that would be disastrous to ordinary collapsible crates.



A typical Bigelow-Garvey Tight Corner Hinged Crate designed for shipping a porcelain enameled range.

B-G Hinged Crates are designed for quick assembly, with completely collapsible mat and pre-drilled nail holes. Three-way corner construction produces an unusually rigid and strong crate. Corners are held securely by 14 gauge wires.

Over 27 years experience—designing and manufacturing crates for shipping appliances and other products for the home—stoves, washers, ironers, home freezers, refrigerators, bathtubs, sinks, and other appliances.

OUR CRATES ARE BUILT TO PASS THE TESTS OF THE NATIONAL SAFE TRANSIT COMMITTEE

Bring your shipping problems to us.

BIGELOW-GARVEY LUMBER CO.

General Office and Laboratory

320 West Huron Street • Chicago 10, Ill.

Mills: Arkansas • Georgia • Wisconsin • Minnesota • Washington

AMA 19th annual packaging exposition draws 19,100 packaging men to Chicago

THE 19th annual National Packaging Conference and Exposition, held at the Navy Pier, Chicago, April 24-27, was the most successful in the history of the event—in the number of exhibitors, amount of space used for exhibits, and attendance, officials of the American Management Association revealed at the close of the show.

Some 19,100 persons attended this year's exposition as compared to the 11,000 persons attending the 1949 show in Atlantic City. The attendance at last year's show was a record in itself.

"Full house" at conference

The various conferences on packaging, packaging and shipping drew "full houses", indicating an increasing interest in both the importance of effective packaging from the standpoint of merchandising and pre-testing of packaged products for safe shipment.

The conferences on Tuesday, April 25, were of the greatest interest to manufacturers of major home appliances and allied metal products. The morning session featured a panel of speakers from General Electric Company who related how their company tackles its packaging and shipping problems.

The afternoon session featured a discussion on "reduction of loss and damage in shipping." The speakers included Edward Dahill, of the Association of American Railroads, William L. Yingling, of American Trucking Association, and Frank. W. Green, industrial packaging consultant.

Interest in cost reduction

The record number of exhibits pointed out that special attention by the packaging industry is being given to cost reduction in the processing of materials for packaging, and in the fabrication of packages and containers of many kinds of materials, including wood, paper, metal, glass and plastics.

Among the many exhibits were special packages designed for the

shipment of refrigerators, washing machines, ironers and other home appliances.

Excerpts from discussion

The following are a few brief excerpts from discussions by speakers before the packaging conferences.

L. M. Burgess, field engineer, H. P. Smith Paper Co., stated: "In the

packaging and storage of metal parts for both industry and the government, where polyethylene coated paper is now an improved packaging material, volume has mounted steadily. . . . This paper is a relatively new packaging material and opened new fields for those interested in packaging new materials in containers heretofore only dreamed about. . . . Actual drop tests have proved that a polyethylene lined multi-wall bag is considerably stronger than an unlined

**This Label on Your PACKAGING
Indicates That You
Are a Certified
Shipper!**



Many thousands of dollars are lost annually in damage claims caused by faulty packaging. As one of the laboratories certified by the National Safe Transit Committee, the United States Testing Company, Inc., is authorized to issue Safe Transit Labels when packaging meets the Committee's Projects 1 and 1A. These labels on your packaging mark you as an approved and certified shipper.

If your packaging does not meet the Committee's requirements, our technicians are ready to cooperate with you in development work on improvements based on test results.

A letter or phone call will bring you complete information on our packaging testing service, how it provides vital protection to you, and how it solves your packaging problems. No obligation, of course.

UNITED STATES TESTING COMPANY, Inc.

Established 1880

HOBOKEN, NEW JERSEY

PHILADELPHIA • BOSTON • WOONSOCKET
CHICAGO • NEW YORK • LOS ANGELES
DENVER • MEMPHIS

Member of American Council of Commercial Laboratories



bag of the same number of plies. . ."

Packaging for export

Frank W. Green, industrial packaging consultant, Springfield, Mass., said that "During the past four years there has been a great deal of talk on all sides about export packaging. The carriers, the shippers, contract packers and container manufacturers have all been blamed.

"All this led up to a meeting at the Maritime Exchange in New York at-

tended by several hundred exporters, suppliers, carriers, marine underwriters, the press and others interested in packaging.

"A committee was formed to find out and to recommend what course should and could be taken to constructively and cooperatively correct the causes of the substantial losses which were so wasteful.

"It might be said that the Committee approached the problem in miniature. The cargo of twenty outbound

vessels of nineteen companies, under seven flags, plying eleven trade routes to all parts of the world were included. This is a good sized sample involving many thousand shipments, thousands of exporters, hundreds of commodities, and hundreds of examples of every type of package.

"From the beginning it was obvious that nearly every recognized type of container was doing a good export job when used correctly to meet known conditions. It follows, however, that export trade with the many handlings involved requires more rugged packaging than can be satisfactorily used for domestic shipment. This applies especially to commodities which normally move in car load quantities.

Export packages handled many times by many persons

"A fact which is too seldom appreciated is that when a ship is being worked everything must be done to expedite the sailing. Special attention cannot be accorded to particular points of strength and weakness of individual packages. Packages are handled many times by many persons without knowing the contents, the containers or even without being able to read the cautionary marks. A better understanding of packaging would be helpful to the people concerned with the movement of cargo on the piers and in the ship. . . .

"Proper export packaging need not be expensive but it must be done right. Any weakness will show up during an export trip and failure will result.

"The most common point of failure is at the closures. . . . A poor closure invites pilferage, will not resist strain and weather. When the closure fails the package has failed.

"The interior packaging must be adequate. Not just adequate for domestic shipments but suitable for many handlings, moisture, and all the hazards of export trade. Many commodities break loose inside the packages and proceed to do more damage to the containers than could be done by handling. In some instances, handling is blamed instead of the inadequate interior packaging.

WEYERHAEUSER CRATES



SHOCK TESTED TO PROVE STRENGTH

● Crates designed by Weyerhaeuser are built to withstand the impact and vibration tests recommended by the Porcelain Enamel Institute. These tests simulate shocks received in shipment—to prove adequate protection for contents, the first essential in good crating.

Weyerhaeuser Crates are engineered to give needed product protection—economically. Their open design permits easy inspection. Diagonal bracing is 65% stronger

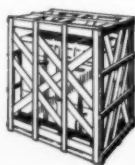
than strut bracing. Corners are nailed for maximum strength and rigidity. To lower assembly costs, and to eliminate costly pre-drilling for nailing, the pieces that receive nails are of soft non-splitting hardwood.

In 18 years of designing and building, Weyerhaeuser has supplied leading stove manufacturers with superior, engineered crates. Your inquiry will receive prompt and experienced attention.

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"Compression strength is extremely important. . . . Packages are often stacked twelve to fifteen feet high on the piers where they are exposed to salt spray, fogs and other weakening conditions. Under normal circumstances they will come in for more handling, more contact with equipment and other cargo than in even a long domestic delivery. . . .

"Although a few items can be exported safely in their domestic packages, most commodities require special programs of carefully planned and coordinated export packaging. Only this way can the shipper have both adequate and economical packaging. In export trade, package engineering meets a worthy challenge," concluded Green.

The trucker's viewpoint

William L. Yingling, of National Classification Board, American Trucking Associations, Inc., revealed several reasons why their Board is reluctant to publish packaging specifications.

"First, we know that motor carriers can transport merchandise in containers that could not possibly hold up in transportation generally. Second, we want to believe that every shipper wants his goods delivered undamaged at destination and will package accordingly. Third, practically every shipment, regardless of mode of transport, either begins or ends by truck, and to publish specifications different from those enforced by other agencies would result in endless confusion.

"Generally, freight in motor trucks is tiered as high as the height of the truck, about seven feet. So the package should be designed to withstand tiering seven feet high with other packages of at least equal density. But this does not take into account road shock. When a truck moving at a speed of 30 mph or greater hits a depression in the road, the load leaves the floor. When it returns, the impact on the bottom package may be as much as five times the total weight of the freight tiered upon it.

" . . . A good shipping container is not enough. It must be supplemented with internal packing devices

—liners or inner containers for bulk commodities; for other merchandise, separators, fillers, pads, macerated paper or excelsior properly utilized. In one case, a shipper of metal kitchen cabinets provided good fiber board containers, corner inserts to prevent shifting, and allowed an inch and a half clearance between the cabinet and the box. But the top edges of the cabinets were dented because the shipper neglected to allow any clearance between the product and the top

of the box. In other cases, the product itself will not hold up under normal transportation hazards regardless of packing.

"A testing program," continued Yingling, "can be successful only when it is accepted by the entire industry group. The committee formulating the program should consist of engineers, traffic men, production managers, carrier representatives, technicians and others whose suggestions may be of value. →

FIBER-and-STEEL STRAP CUSHIONS AS IT BINDS



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FIBER-and-STEEL saves time and materials in packing, makes uncrating easy, and leaves no adhesive stains. It is secured with a soft aluminum Gerrard seal.

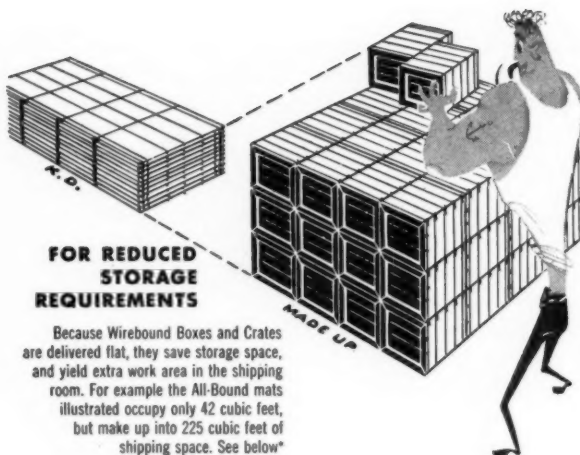
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- Norgo Division
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IN YOUR PLANT

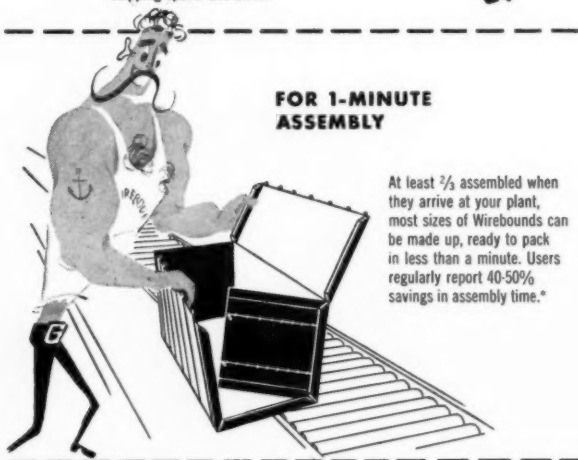


1958 Hawthorne Place, Melrose Park, Ill.
(Chicago Suburb)



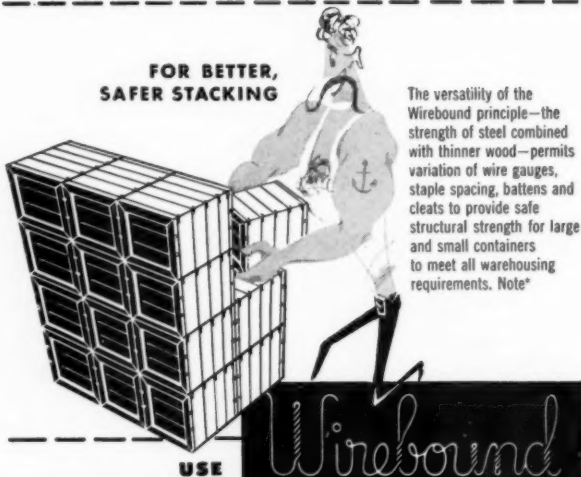
FOR REDUCED STORAGE REQUIREMENTS

Because Wirebound Boxes and Crates are delivered flat, they save storage space, and yield extra work area in the shipping room. For example the All-Bound mats illustrated occupy only 42 cubic feet, but make up into 225 cubic feet of shipping space. See below*



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At least $\frac{2}{3}$ assembled when they arrive at your plant, most sizes of Wirebounds can be made up, ready to pack in less than a minute. Users regularly report 40-50% savings in assembly time.*



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Safe Transit cited as a successful program

"A testing program cannot be limited to a drop test, an impact test, or a vibration test—it must embody all these methods." (The test procedures adopted by the National Safe Transit Committee were cited by Yingling as having produced results that are most gratifying.)

"Test equipment must be standardized; otherwise uniform results cannot be obtained. Use of impact recorders is a must. Test procedures or methods of testing must be agreed upon and a level of tests and impact recordings adopted. Such a program should be voluntary and should result in a packaged product that will reach destination in the same condition in which it left its origin point."

Use "Fragile, Handle with Care" and "This Side Up" only when necessary, urged Yingling.

"Very few people see advertising on shipping cases, and in some cases it is an invitation to pilferage; it is of value only for merchandise requiring special handling, stowing or protective service."

In conclusion, Yingling advised the packaging men: "Design your shipping containers to withstand the normal hazards encountered in other forms of surface transportation and be secure in the knowledge that the trucks can handle them safely."

How G-E tackles its packaging, packing and shipping problems

F. G. Moloney, of G-E's manufacturing policy division, stated that "General Electric spends from \$35 million to \$40 million annually in packaging, packing, and shipping. The cost of packing varies from a fraction of a cent to many thousand dollars for a single product.

"We are in process of setting up centralized research on packaging and material handling to eliminate duplications and keep all departments and divisions informed on the latest in packaging and material handling. This group would conduct research and issue specifications for standard test procedures and designs. Work-

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Carloading methods (Part 3, Section 6)

illustrating some recommended materials handling methods and equipment

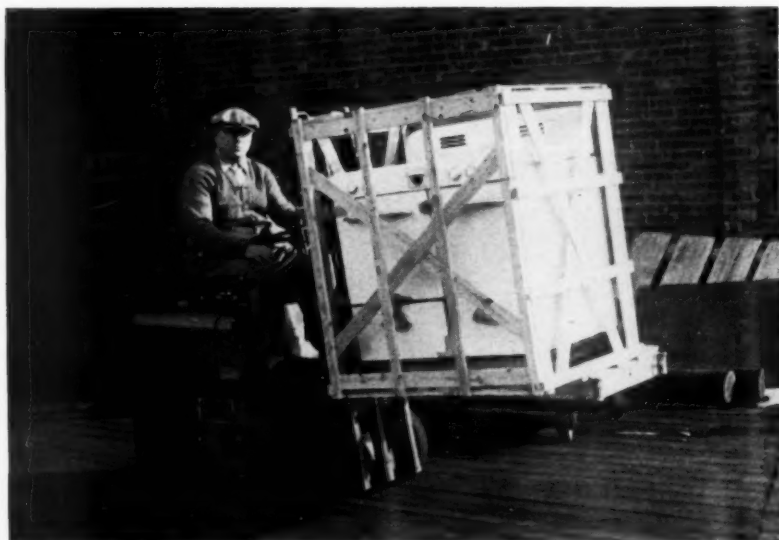
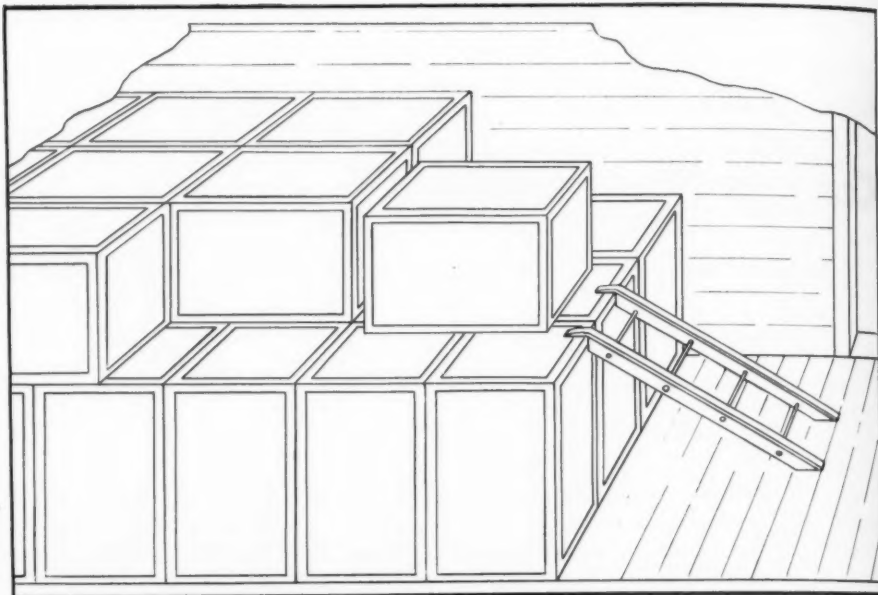
Editor's Note: In Part I, Section 1, which was published in April *finish*, thirteen drawings and seven photographs were used to show loading and bracing methods for stoves, ranges, home freezers, kitchen cabinets, bathtubs (loaded flat), and sinks (loaded flat). In Part II, Sections 2-5, published in May *finish*, thirteen drawings and four photographs were used to show loading and bracing methods for refrigerators, water heaters, bathtubs (on end), sinks (on end), and other high loads; small appliances in cartons, crates and boxes; and stop-over and miscellaneous loads.

Photo shows a collapsible gravity roller conveyor used for carloading.



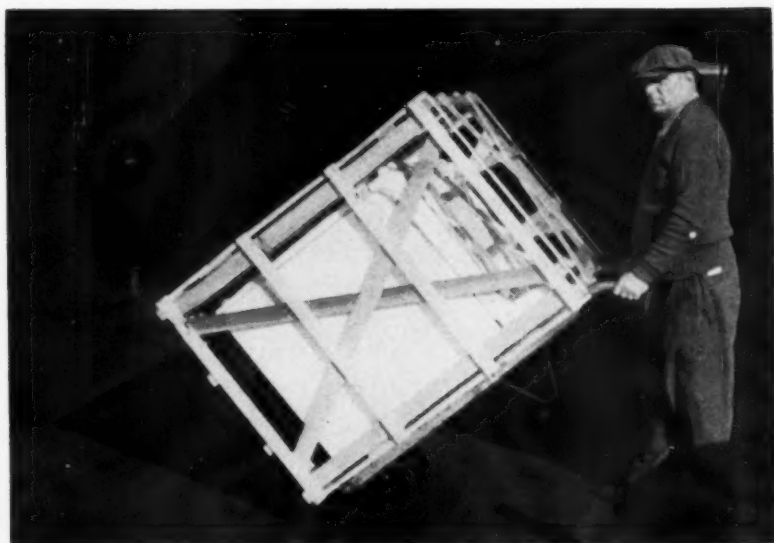
**UNLOADING
SKID
XXVII**

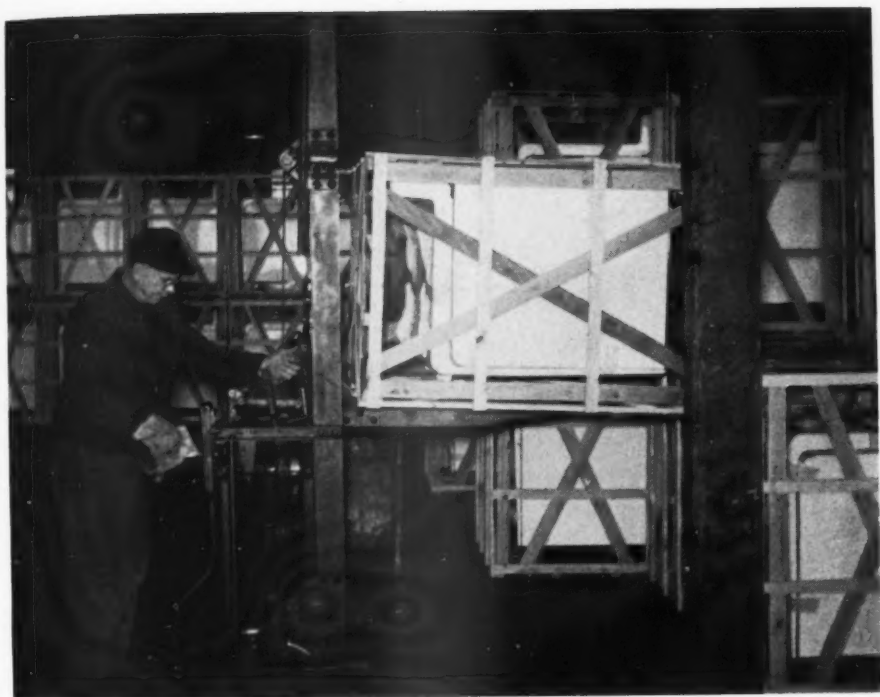
*Illustrating the use of an
unloading skid when man-
ual handling is employed.*



*A conventional high lift fork truck
for loading, unloading and stacking.*

*A conventional 2-wheel hand truck
for handling crated products.*





An electrically operated machine used for stacking crated products in warehouses.



Long-fork lift truck commonly used for loading refrigerators or other high load products on second layer (stowed on back).



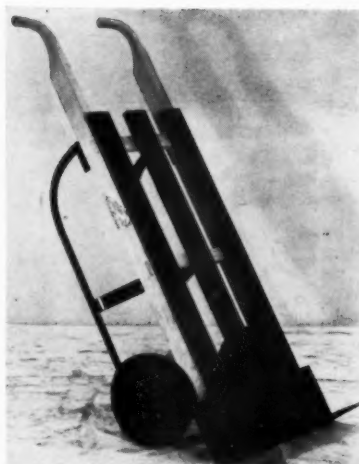
Left: Photo shows a refrigerator mounted with slings on a two-wheel hand truck.

NOTE: This concludes the three-part article developed by the Loading Research Division of the National Safe Transit Committee.

Readers interested in obtaining reprints of this series should write to the National Safe Transit Committee, 1010 Vermont Avenue, N.W., Washington 5, D. C.

Right: A padded hand truck with two pneumatic tires.

Below: Another padded hand truck for handling uncased products.



Below: A padded four-wheel hand truck, with pneumatic tires, used for handling uncased products.



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Packing exposition ...

→ from Page 72

ing with the material handling engineers and the purchasing and traffic department, they would endeavor to standardize incoming packaging and material handling. They would evaluate the best way to receive and handle vendor shipments, intra-plant shipments, customer shipments, and warehouse shipments. The effort would be to palletize and to have incoming packaging so designed that the material could be stored at point of use in the original container, or to eliminate packaging entirely," said Moloney.

G-E innovations described by Benzie

Several packaging developments now being used by General Electric Company were explained by H. J. Benzie, production manager, appliance and merchandising division. One G-E development in the packaging of heavy products is the packaging of refrigerators in all-corrugated boxes.

Another innovation outlined by Benzie has been the elimination of packing entirely in the case of dishwasher tubs. These dishwasher tubs are loaded in racks that are part of the railroad car equipment itself and, in addition, the car is equipped with Duryear underframe, AAR Designation XM, which permits the longitudinal movement of 7 inches in either direction beyond that of the average car. The racks are of G-E design although the idea, as pointed out by Benzie, is not new. The rack was designed, a mock-up made, and then work done with railroad representatives. The idea was presented as a contribution to claim prevention based on test shipments combining the new rack and the special cars.